25

Contents for May 1955

Could You Profit on 10 Cent Beef?	Farm Journal	1
The Bunker Silo	T. J. Rutherford	5
How To Protect Against Calf Scours	The Ayrshire Digest	8
Early Beef Calves Worth More Money*	Purdue University	10
What's New in Farm Machines?	Missouri Ruralist	11
Diethylstilbestrol Endorsed With Limitations*	Virginia Extension	15
Nitrogen Calls For More Minerals	Better Crops with Plant Food	16
The Modern Farm Shop	The Young Farmer	19
Minnesota Tests Fertilizer Merits*	Agricultural Leader's Digest	23
Forage Crop Irrigation	New Jersey Agriculture	24
No Shovel Needed	Ohio Farmer	27
Big Cows Are Best	Wisconsin Agriculturist and Farmer	29
More About Social Security for Farmers	Indiana Farmer's Guide	31
Compare Hay and Corn Silage for Lambs*	Minnesota Extension	34
Vet's Notebook: Mastitis	Farmer and Stock Breeder	35
New Mulches Increase Garden Yields	California Farmer	38
Soil Fertility Doesn't Change Food Value*	Michigan State College	40
Drier Fan also Ventilates Dairy Barn	Electricity on The Farm	41
Several Effective Fly-Baits Available*	VPI Newsletter	42
Grow Grass by Keeping Cover	The Cattleman	43
Management of Turkey Breeding Flocks	Turkey World	45
How To Organize a Land Judging Contest	Crops & Soils	50
How Much More From Irrigation	Successful Farming	53
Orange Tag Sorts Brucellosis Vaccinates*	Roy L. Cuff	54
Does A Break In Growth Hurt Beef Cattle?	Agricultural Research	55
New Weed Killers and How To Use Them	New Jersey Farm & Garden	57
Wide Row Corn May Bring Changes*	University of Wisconsin	60
Mulches for Fruit Trees	American Fruit Grower	61
Protecting Against Mineral Deficiencies	Holstein-Friesian World	63
Feeding The Brood Sow	American Hampshire Herdsman	67
A Bank's Farm Program	Banking	70
Farming on Formosa	Farm Research	73
Multiflora Rose Makes Useful Fence*	University of Kentucky	76
This Tree Farm Casts a Far Shadow	Soil Conservation	77
Chinese Chestnut Gains Favor	The Southern Planter	81
Corn in Sod	Pennsylvania Farmer	83
Open Sheds Better for Dairy Calves*	University of Wyoming	85
Funny Farm Story Clearing House	Collected	86
The Grain Market: Speculation or Gambling?	Morris Braun	87
Wasted Feed*	Louisiana Extension	93

*Short Features in This Issue. One Year Continuing Index, pages 94 and 95

FARMER'S DIGEST STAFF
Editor — L. Bush-Brown
Publisher — Hugh Highsmith
Office Manager — V. M. Binkert

ADVISORY EDITORIAL STAFF
William A. Albrecht, Chairman, Department of Soils, U. of Mo.
Hugh H. Bennett, Ex-Officio, Soil Conservation Society of America
G. B. Gunlogson, Agricultural advertising and sales promotion expert
H. J. Reed, Dean of the School of Agriculture; Purdue University
T. J. Rutherford, Director, Veteran's Land Act, Ottawa, Canada
W. T. Spanton, Chief of United States Ag. Education Service

Published monthly, except June-July and August-September, when published bi-monthly at Fort Atkinson, Wisconsin, by Farmer's Digest Co.

1 Yr., $2.50, 2 Yrs., $4.50, 3 Yrs., $6.50 Canadian and Foreign Subscriptions, $3 for 1 Year, $5.50 for 2 Years

POSTMASTER: Return all undeliverable copies to Farmer's Digest, Fort Atkinson, Wis. Entered as second-class matter at the Post Office at Ambler, Pa., July 30, 1948, re-entered at Fort Atkinson, Wis., under the act of March 3, 1879.

[redacted]

Below are a few of the carefully selected articles to appear in the next issue of Farmer's Digest. If your subscription is expiring or if you are not now a regular subscriber, take a minute now to renew or enter your subscription.

How To Certify Your Dairy Barn
Cutting Corners in Chores
6 Keys to Dairy Modernization
Seed for Tomorrow's Grassland
Are You Making Enough Profit?
How To Be a Top Beef Feeder
Now, Fertilize to Match Moisture
More About Band Seeding
Wean Pigs at Three Weeks
New Era in Poultry Housing
Making Grass Silage with Bisulfite
Zero Grazing, New Idea
"No Work" Feeding
Self-Feed Phenothiazine To Sheep
Irrigation On Livestock Farms

MOZ-ALL IS BEST

PERFECT POWER BALANCE UNIQUE DESIGN
EXTREME RUGGEDNESS SELF PROPELLED
COMPLETE SHIELDING INSTANT CONTROLS

MOZ-ALL cuts smoother, maneuvers faster, climbs steeper, pivots quicker. Zip thru tallest, toughest weeds. Give your lawn a "treat". Try MOZ-ALL on dense undergrowth, heavy brush, vines, thistle, sumach, unsightly weed patches. Maximum safety–No stalling. Trim fence rows, orchards, yards. Whip the "leaf problem" without raking and burning.

KIDS OF ALL AGES LOVE TO "RIDE" WHEN THEY "WORK"

THOUSANDS OF USERS TELL EVERYONE THEY KNOW— MOZ-ALL IS THE BEST POWER LAWN MOWER AND WEED CUTTER ON EARTH!

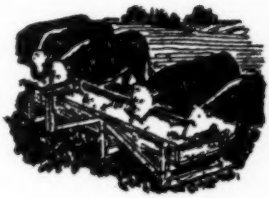
New RIDING SULKY available for any model MOZ-ALL as extra equipment

ONLY YOU CAN DECIDE ON THE BEST MOWER FOR YOU ... SEE AND TRY MOZ-ALL AT YOUR DEALERS - or write for free literature to:
WIND-KING ELECTRIC MF'G. CO., MERRILL, IOWA, U.S.A.

The **Farmers Digest**

Volume 19 May, 1955 Number 1

Could You Profit on 10 Cent Beef?



The Brewsters are running their ranch like a factory . . . their product is a low-cost, high-quality meat animal buyers want . . .

Condensed from Farm Journal

Paul Friggens, Wisconsin Alumni Research Foundation

FEW operators today could turn a profit if beef was selling for 10 cents a pound. Yet one Montana ranch is deliberately gearing itself to do just that.

Aiming to put an extra 75 to 100 pounds on most classes of cattle sold, and upping *quality,* too, the Brewsters of Rosebud County, Mont. are setting a production pattern hard to beat. Should beef prices break again, they'll be set to take it.

In just seven years, the Brewsters have increased their yearling steer weights from below 640 to an *average* of 716 pounds in 1954.

Brewsters are building a *brand name* for their cattle, and have pioneered with an exclusive "X Diamond Bar Sale Day."

The enterprising team of Lyman and Anne Brewster actually blueprinted all this in advance! For years they'd operated family interests on the Tongue River in rolling southeast Montana, not far from the Custer Battlefield. Then in 1947 they cut loose on their own. But first they drew up a "Blueprint for Beef Production":

Run a ranch like a factory. Market a uniform, low-cost product by putting at least an extra 100 *pounds on every animal sold.*

For their "factory," the Brewsters leased 83,000 acres—Indian, Taylor grazing, and deeded land

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

—and plunged to stock it with 2,700 cattle. Skeptics scoffed: "They're already broke, but don't know it!"

"Cattle prices can't stay up forever," Lyman told me at that time. *"We're gearing this operation to stand a price break, even down to* 10 *cents."*

I have checked back on the Brewsters, and the verdict is in—they've taken their raps, and in only seven years managed to build the beef herd of a lifetime! How did they do it?

At their isolated summer headquarters, Muddy Cow Camp, we discussed their 5-point Blueprint for Beef.

● Buy top-quality sires — The Brewsters pay $1,000 and more for bulls for the commercial herd. "Nobody ever went broke buying a *good* bull," Lyman insists.

They were able to get an 83,000-acre lease, and they wanted to stock it as soon as possible. The final breeding herd of 1,200 was about half "put-together" cattle. Then the Brewsters turned to highest quality sires, preferably from Register-of-Merit breeding.

They wanted big, useful, easy-fleshing cattle that would raise a good calf, winter economically, and sell good. Where to get sires?

Lyman and Anne made an exhaustive run-down of the breed blood lines that provided the most herd sires in America. Their trail led to the Wyoming Hereford Ranch, Cheyenne, where they had gotten the original stock for their own registered herd.

They paid more than $1,000 for a set of range bulls, and $2,500 for a sire to go on the registered herd. Soon, from their small registered cow herd, they started raising their own bulls.

Seven years ago they started with a 640-pound average—about normal weights for eastern Montana. Last fall, in spite of a late, intense drought, Brewster's yearling steers averaged 716, and the light end of the heifers 650. Thus the Brewsters are well on their way to the 100 *pound gains on steer sale weights they had blueprinted!*

Younger cattle do the job, with the upgraded heifers outproducing the cows.

● They raise a big calf crop—never under 90%.

The Brewsters average 90% to 95% on 1,000 to 1,200 breeding cows. This is particularly amazing, because their entire adult range herd is bred in one big range pasture—about a township! The only separate pastures are for the yearling heifers and registered cattle.

What's the secret of this big crop?

Brewsters supply a bull for every 25 cows, and then run a few extra. Their range provides green feed throughout the breeding season.

There's all-around good management. They don't waste bull service on cows and heifers slated for market. During branding they cut out their dries, undesirable breeders, and cattle to be vetted, and hold them in pastures until serviced or sold.

Big, easy-fleshing cattle, the breeding herd usually winters without supplemental feed.

Calving their *larger* heifers at two, Brewsters get an extra calf crop—and are sold on it. They breed by size rather than age. Each year they pick 200 replacement heifers from about 600 head. Around August 1, they turn in yearling bulls for six weeks.

Brewsters don't pamper these heifers with extra feed or caking. They hand-calf in small pastures. "We lose about 10% of the calves, but that extra calf crop covers a lot of overhead." Last year, they lost only two heifers.

● Beat Bangs, other diseases—keep losses under 2%.

"We hardly look at our breeding herd during calving," Brewster told me. "Main reason is that vaccination has given us practically a Bangs-free herd.

Hard-working Brewster is president of the Montana Livestock Sanitary board, and a member of Secretary Benson's USDA Foot-and-Mouth advisory committee. He practices every bit of disease control that he preaches.

Brewster gives the dual blackleg-malignment edema shots in the spring, and the straight blackleg booster shot in the fall. He feeds bone-meal, mineral mix, and salt, the year around, gets no nutritional abortions.

I saw branding at the X Diamond Bar. Lyman's five-man crew picked clean ground, set a few stakes, unrolled the snow fence, and a cowboy was ready with a propane gas iron to slap 'er on! They normally handle only 100 to 125 cows and calves at any one time. After dehorning (with tubes) and castrating, cowboys DDT-sprayed for lice and flies, and cows and calves mated up in a hurry.

"We never bunch many cattle for any purpose," Lyman emphasized.

Brewster has stopped his weaning troubles in the same way. He weans in early November—gives the cows a six weeks rest to get set for winter.

After weaning, and during the winter, Brewster feeds the calves all the good alfalfa and mixed hay they'll eat. Salt and mineral are always handy. About January 1, steer calves get a pound of cake or its equivalent in grain. Brewster hasn't caked his heifers at all during the past two easy winters.

Wintering losses? Less than 2% for calves, and overall under 1%. Biggest trouble is with ur-

mond Bar. And they never overstock. " It just shorts your weights. Besides, cattle summered on short range make you pay for it next winter."

● Market a brand name—capitalize on quality cattle.

Five years after their blueprinting, Brewsters were doing it!

At Billings stockyards in October, 1951, they inaugurated an exclusive sale of their own brand —"X Diamond Bar Day." It was advertised widely. Brewsters made a banner offering of 225 "Register - of - Merit" yearling steers, together with 200 head of mixed cattle. Lyman and Anne went home with $106,244.43!

The Brewsters weathered the big cattle slump, virtually completed their "plant," and today are completely liquid.

The blueprint did it—*top quality sires, big calf crop, beat Bangs, double feed and water, and build a brand name.*

In 1954, the X Diamond Bar "factory" finally reached volume production, marketing 960,000 pounds of beef. Operating costs: $93,000. That figures to about 10-cent beef.

inary calculi—water belly.

● Double feed and water—twin keys to peak production.

They call the X Diamond Bar one of the best improved outfits in the West. Yet it's entirely leased. "We just treat it as if we owned it," Brewsters explain. They've probably spent $100,000 on seedings, water, and fence.

To guarantee winter feed, Brewster is developing 1,000 acres of irrigated pastures and hay lands along the Tongue River bottoms — converting sagebrush into new meadows every season. We're fertilizing heavy, and trying to grow most of our protein."

At the same time, Lyman is developing every available spring and water source on the ranch. He was drilling his first well before the lease was signed!

Finally, the Brewsters repaired and re-fenced the whole outfit for easier handling—had crews fencing for five years. Today the lease is divided into three big units—about a township to each —for breeding, spring calving, and winter range, with plenty of holding pastures.

You can't imagine a better balance between winter and summer operations than the X Dia-

---

Seeding wheat in corn rows spaced either 60 or 72 inches apart, where a small tractor and a narrow grain drill are available, brings better wheat crops without penalty to the corn yields, said G. H. Stringfield, U.S.D.A. This method allows more timely seeding of the wheat and results in more orderly Fall work.

The Bunker Silo

The low cost "bunker"—a trench silo above ground is proving popular in Canada. Here's why . . .

T. J. Rutherford, Director of Soldier Settlement & Land Act, Canada

THE innovation that has done most to make possible complete and low cost mechanization of grassland agriculture, and is largely responsible for its rapid increasing popularity in Canada, has been the introduction of the self-feeding bunker type of horizontal silo.

This silo consists simply of two walls, six to eight feet high, made of tight planking and slightly, but only slightly, sloped on the inner side. This planking is nailed to posts set four feet in the ground and at four foot centres. Every second side post may be left eighteen feet above ground in order to support a permanent roof, to be added later if desired.

Chopped hay, also to be self-fed, may then be stored above the silage with moisture-proof paper between. The width between the walls should be not less than twenty-two feet and should be a multiple of the width of a buckrake load or truck. whichever is to be used in filling. The silo should be long enough to hold at least one and one-half times the amount of feed required in any year; this in order that a reserve may be built up in years when grass is heavy to be used in years when it is light.

Grass silage keeps well, particularly when stored in a large mass. A cubic foot of silage varies greatly in weight depending on moisture content, but its hay equivalent is generally between fourteen and sixteen pounds. This may be used in estimating the size of silo required.

The bottom of the bunker should be about twelve inches above grade and, where possible, should slope to the open end, which should be towards the South for good self-feeding. An earth ramp about four or five feet high up to the North end of the silo is a considerable advantage, as is also a paved floor. The bunker is filled by driving the tractor buckrake or loaded truck through the silo and either dumping the grass or distribut-

Reprinted by permission of the author,
a member of Farmer's Digest's Advisory Editorial Staff

ing it with a power box unloader.

The bunker silo has a great many advantages over other types. As good or better grass silage can be made in a bunker, and with no more waste than in a tower silo. The bunker being all above ground, well drained and open at one or both ends, self-feeding is practical. The bunker makes possible complete mechanization of the ensiling and feeding operations, using only a tractor, mower and buckrake or, alternatively, a forage harvester and dump truck.

The bunker eliminates the need for the expensive elevating equipment required for a tower silo and greatly speeds up unloading operations. It permits controlled compaction and thereby gives some control over the fermentation processes. It makes it practical for more material, if not too high in legumes, to be ensiled without wilting since a considerable amount of drying takes place on the large surface of the silo while it is being filled. Any seepage can also drain away freely from the bottom. As grass from different fields, and cut at different times, goes into the bunker in layers, and as some of each is exposed for feeding each day, no radical changes of feed are experienced such as sometimes occur when a tower silo is used.

A self-feeding bunker silo can always be built in a place convenient to existing buildings and may be used as a windbreak on one side of the paved yard with the loafing barn on the other. The cost of a bunker silo, ton for ton capacity, is only a fraction of that of a tower silo and is no more than a properly constructed trench silo.

Although the exposed surface of a bunker silo is comparatively large, the fact that the silage can be compacted with a tractor, truck or horse during filling and for an hour each day for eight days thereafter makes it possible to effectively control top spoilage. If the bunker is covered with four inches of sawdust, none of the silage should be unfit for feed.

When early cut high moisture material is put in a tower silo, wilting to about 30% D.M. or the use of preservative is almost a must. This is not, for the reason given previously, as imperative when a bunker silo is used. However, if the percentage of legume is high, there will be less fermentable carbohydrates and when these are diluted by a high moisture content, wilting should be practiced. However, as silage making progresses, and certainly for the top two or three feet, wilting should be discontinued. Preservatives consisting either of high carbohydrate material or an inorganic acid, if properly used, greatly improve

the odor and palatability of grass silage. Some of these are difficult to apply and all add considerable to the cost. Sodium metabisulphate would seem to have certain advantages over the others and its use may well prove to be economic.

If grass-legume crops are stored in a cheaply constructed bunker silo, and using only a tractor, mower and buckrake, one man can cut, wilt, ensile and pack approximately twenty tons in a ten-hour day. With an extra man and a five-foot horse-drawn mower this can be increased to thirty tons. The five-foot mower permits two swaths to be picked up. The horses may also be used to do the packing.

Long grass stored in bunker silos is being self-fed quite satisfactorily and cattle seem to prefer it to chopped material. If it is to be taken out to be fed, this is easily done by cutting the silo down every four or five feet with an ordinary hay knife. The silage may then be forked out quite easily.

One man can ensile up to thirty tons using a second-hand truck equipped with dump or power box (the latter being also adaptable as a manure spreader) and one of the new less expensive types of direct-cut forage harvesters which may be drawn by the truck that hauls the grass to the silo. If it is necessary to wilt the grass before ensiling, an extra man with team or tractor and mower will be required. These new type direct-cut forage harvesters will also pick up wilted material or dry hay directly from the swath, eliminating the side delivery rake and extra pickup attachment for the harvester which involve considerable additional investment and extra work.

Where a large acreage is to be ensiled and help and equipment are limited, operations may be spread over a longer period and still kept timely if both early and medium mixtures are grown separately.

The same equipment used to make silage may also be used to cut and d e l i v e r subsequent growths of grass as green feed to the cattle which may then be kept all summer long in a convenient shaded paddock where they pastured during the spring. This practice considerably increases the amount of summer feed available from each acre and, as compared with direct pasturing of subsequent growths after silage has been taken off, it helps to maintain the legumes in the stand and reduces the danger from bloat.

If a newborn eight pound human baby grew as fast as a modern broiler chick, he would weigh over 300 pounds in ten weeks.

How To Protect Against Calf Scours

Early virulent calf scours take a heavy toll in many dairy herds . . . can be controlled with this new treatment . . .

Condensed from The Ayrshire Digest

Dr. C. P. Segard

'FARMERS can save an estimated five to six million dollars every year by a drive to check the nation's top calf killer, white scours,' says the American Foundation for Animal Health.

White scours, also known as virulent or early scours, usually occurs within 72 hours after birth. It is caused by bacteria that enter the digestive tract before the calf receives its first feeding of the colostrum, or first milk. Colostrum normally contains the antibodies (disease fighters) that must be present in the blood of the calf to fight off infectious diseases. The calf is born without a supply of these disease fighters in the blood and in the normal course of events, receives them in its first few meals of colostrum. The antibodies in the colostrum can only be absorbed by the intestinal wall during perhaps the first 48 hours of life. After that, the calf develops antibodies in the blood stream.

There are several conditions which may arise to prevent the calf from receiving an adequate supply of colostrum during the first few hours of life. These incluude: (1) Dam produces insufficient colostrum due to a short dry period, or none at all; (2) Calf too weak to stand and suck; (3) Inability of the calf to reach or locate the udder for a variety of reasons.

Why Early Calf Scours Develop

When the calf does not receive colostrum soon after birth, disease producing bacteria, if present in the intestinal tract, will multiply very rapidly since there are no antibodies in the blood. In such cases, the calf develops a diarrhea of whitish color, a sign of trouble well known to experienced herdsmen. The irritation of the bowels causes inflamation and the collection of a

Reprinted by permission from The Ayrshire Digest, Brandon, Vermont

watery mass which is frequently discharged explosively. Dehydration, or loss of water, takes place from the bowels and from excessive drooling. This results in sunken eyes, dry skin and hair, and general weakness.

The breeder of pure bred cattle of high productive inheritance quite naturally must have every calf born. It is for this reason that every cattle breeder will be interested in KafmalaK.

What KafmalaK is—

and How It Works

KafmalaK, the early scours preventative, is a practical solution to the calf scours problem. Developed by Dr. Karl Paul Link of the University of Wisconsin, this product is prepared from the blood of normal mature cattle irradiated with ultraviolet rays, spray-dried, and fortified with vitamin K and predigested milk solids.

KafmalaK contains a high concentration of gamma globulin, that portion of the blood which contains the same antibody factors that are present in colostrum. The gamma globulin in KafmalaK is absorbed through the bowel walls of the calf during the first 24 hours after birth and, therefore, can take the place of colostrum.

The vitamin K in KafmalaK fortifies the new-born calf against the hemorrhages that occur with most intestinal inflammations. The pre-digested milk solids supply necessary proteins that are readily absorbed, even though there is a shortage of digestive juices in the first few days of life.

KafmalaK, used according to directions, will help to protect your calves against early scours and will result in improved health and vigor for your future herd. KafmalaK should be fed to every calf. It is a preventative, not a cure, for early scours.

The entire contents of one package of KafmalaK (51.05 gr.) can be easily mixed with a quart of whole milk warmed to body temperature and thoroughly shaken. A pint of this mixture is given to the calf within one to two hours after birth and the remaining pint about six hours later, for most effective results.

The calf should be allowed to nurse the cow as soon as able in order to get its supply of colostrum. Overfeeding should always be avoided.

Results of Tests

In the spring of 1950, Dr. Link sent some KafmalaK for testing in the large Jersey herd at Biltmore Farms, Ashville, N. C. They reported as follows:

'It was apparent soon after the experiment was under way

that those calves receiving KafmalaK (every other calf, as born) were not developing the early type of scours. This was clearly brought to our attention when our supply of KafmalaK was exhausted for a period of a month. During this time, 71 calves were born. Twenty-one developed scours, 14 within 72 hours after birth; nine of the 14 died. This was an extremely serious outbreak, and when the feeding of KafmalaK was resumed less than 1% as compared with 6% in the 301 controls which received only colostrum.

The Wisconsin Alumni Research Foundation, Madison. Wis., is now making KafmalaK available to purebred cattle breeders.

Beef Calves Born Early Worth More Money

"Calves that make the most money for farmers are born in January, February, and March," says Henry Mayo, extension animal husbandryman at Purdue University.

Mayo says that calves are worth $10 more for each month earlier they are born in the year. In other words, a calf born in January is worth $10 more than one born in February, $20 more than one born in March, and so on.

This economic advantage, Mayo thinks, comes from taking advantage of certain natural stages of the calves' development. Early calves are able to utilize all of the milk produced by their mothers, and are big enough to start eating grass as soon as it becomes available. Also, calves can be dehorned and castrated before they are turned out on pasture, which is easier on the calves, is easier for the farmer to do, and avoids fly troubles that would have to be reckoned with later on.

To take advantage of early calving, farmers should plan to keep bulls away from the cow herd until the breeding season begins sometime after April 1. This means that strong fences will be needed around the exercise lots.

Mayo points out that while the average number of beef cows on Indiana farms averaged 102,000 during the 1935-39 period, there were 318,000 beef cows in Indiana on January 1 of this year. These increased numbers mean increased competition in producing beef at the lowest possible price. Therefore, one of the most important ways to increase returns from the beef cow herd is to plan for calves to come early in the year.

Purdue University

What's New in Farm Machines?

The new tractors are efficient and easy to operate . . .

Condensed from Missouri Ruralist

Gordon West

POWER, specialization and and ease in handling—that's the big news in farm machines for 1955.

Farm equipment manufacturers are making modern machines bigger and better in every way. They are easier to handle, safer—better brakes and improved steering — more comfortable. They have more power with better control, improved engines, hydraulic controls and hitches which easily hook up in seconds without your getting up from new softer seats.

The machines of today (and the future) will grind more feed, bale more hay, harvest more grain per hour. They can do all kinds of jobs quicker and better. Posthole digging is a breeze with a new digger. Getting silage out for feeding with a new unloader is big news. You can even attach a special-type air-conditioning unit to a tractor! Improved self-propelled harvesters do a better job, and need less service.

Now, for a preview of some of the new farm machines for 1955.

FARMALL TRACTORS include a new line: Farmall 400, Farmall 300, Farmall 200, Farmall 100 and Farmall Cub. Each has new family-styling, new Fast-Hitch (with matching set of implements), many other features.

Farmall 200 is a 2-plow, 2-row tractor which replaces the Farmall Super C. Drawbar and belt power are increased. A new attachment, the Hydra-Creeper drive, allows full-throttle speed for very slow field work, such as transplanting crops.

Farmall Cub has improved steering, stronger brakes and a new oil filter element to provide maximum safety. Cub is a 1-plow, 1- and 2-row tractor for small acreages.

Biggest of International Harvester Farmall tractors is the *No.* 400, which replaces the Super M-TA tractor. It retains the torque amplifier and inde-

Reprinted by permission from Missouri Ruralist, Kansas City, Missouri

pendent pto (power take off), and has the new Hydra-Touch hydraulic system with easy-to-reach controls. Has new full-view instrument panel and new "economizer" carburetor to reduce gas consumption on part-load operation.

Farmall 100, is a 1- and 2-plow tractor designed especially for farmers with high-value crops. Has more power, Culti-Vision to see rows easier, stronger hydraulic Touch Control and stronger steering gear and tie rods.

Farmall 300 is for the farmer who needs a full 3-plow, 4-row tractor that's exceptionally versatile. Operating controls are relocated so they're quicker and easier to reach. Torque amplifier permits changing speeds and increasing pull power "on the go."

ALLIS - CHALMERS Mfg. Company announces their new tractor-mounted tiller disk plow. It features fast-handling, smooth pentration and natural following. Quick-hitch reduces get-ready time. Has wide-cutting width and ability to work every inch of ground without leaving uncut ridges. Designed for use in fairly loose soils, it's ideal for plowing small grain stubble; for chopping and turning under corn stubble; for summer-fallowing; for plowing under green manure crops, weeds and trash. Tops for low-cost seedbed work.

GEHL CHAIN-FEED Forage Blower of Gehl Brothers Manufacturing Company has tractor pto drive to increase capacity. Same tractor which brings wagons from field can operate blower. Belt power also may be used. A blower-driven unloader, or a portable electric unloader, may be used to operate a self-unloading wagon. There's a Feed Leveling device; easily adjusted, to suit the crop to be blown, preventing overloading and clogging. Extra-long, tilt-up feed table has a side-board which increases depth of feed table and helps prevent splash.

To meet growing use of sodium bisulfite in making better grass silage, Gehl has designed a new Sodium Bisulfite Feeder which attaches either to blower when filling upright silos, or to forage harvester for trench silo operation.

MINNEAPOLIS - MOLINE Company introduces its new self-propelled SP-168 Harvestor. Major improvements: controls are more convenient, operator comfort is improved, servicing requirements are greatly reduced, and separating mechanism, engine and over-all construction greatly improved. Power steering is simple and easy.

Long, feeder raddle is full-floating and is spring-loaded fore and aft, so it automatically ad-

justs itself to thickness of grain load. New raddle spreads a smooth blanket of grain for the cylinder. MM dual-control lever adjusts header height and variable ground speed. Engine has greater power, operates harvestor on hilliest terrain and in heaviest crops.

NEW HOLLAND MACHINE COMPANY has a new Super 77 pto baler which achieves smooth, quiet and even baling. Capacity is 8 bales a minute! Minimum power requirement is a 2-plow tractor. Features an overrunning automotive type clutch for better operator control. Tractor gears are protected from flywheel momentum and time is saved because there's no need to wait for a full stop while changing gears.

The super 77 will bale crops green, semi-cured or dry—you can move hay faster from field to mow at right stage of curing. You can make better hay this way.

NEW IDEA FARM Equipment Company has a new hydraulic loader designed for shorter wheel base row crops and small standard tractors. This No. 40 model is designed for Case VAC, VAC-14, Case DC-4, John Deere 40, Allis-Chalmers CA, and International Harvester Farmall 200.

BURCH PLOW WORKS INC., announces their Small Pioneer Disk Harrow, 5'3" cutting width, for use in close places. Utilizes same all-steel bearings, design and field-proved engineering, as its larger companions. Gangs are independently adjustable for best results under varied conditions. Harrow is available with 16-, 18- or 20-inch round or cutout blades.

MASSEY - HARRIS "Hitch-All" is a new, heavy-duty, 3-point hitch. Makes implement hook-ups fast, easy. Exclusive wrist-action takes care of any height variation between tractor and equipment. Simple design eliminates numerous mounting brackets, braces and bolts. Takes wide variety of tools.

J. I. CASE COMPANY has a new, completely automatic, twine-tie pickup baler for family-size farms. Model "130" is a 1-man baler. Features simplicity of construction and operation. Has minimum of working parts, and an improved folding action in baling chamber which saves power for slicing and compressing bale.

Newly - designed adjustable feeder head, slotted plunger and extra long bale-chamber side tension helps produce square, evenly-packed, tight bales. Length of bales can be varied from 12 to 42 inches. New needle design provides greater clearance for incoming hay.

KRAUSE PLOW CORPORATION, Hutchinson, Kan., announces a 2-disk reversible disk plow. Direct-mounted. Reverses itself automatically; will plow either left or right. For turning soil on level or hillside; either irrigated or dry-land farming. Field-tested. Sturdy construction for long action under tough conditions.

JOHN DEERE new self-propelled combine, the No. 45, with 8- or 10-foot cut and 26-inch separator. Proved features and new refinements insure easier operation and better, more profitable harvests. Has hydraulic selective ground speed control, which permits combining at any speed from a mere crawl on up. A 40-bushel, auger-unloading grain tank empties in a little over a minute.

John Deere No. 14-Twine-tie Baler features a power-driven pickup that's 53 inches wide with an extra 8½ inches added by side flares; a large floating auger feeder which adjusts automatically to feed light or heavy crops; a fork-type feeder to move hay into bale case and distribute it uniformly for well-formed bales.

THE OLIVER CORPORATION has a completely new, all-purpose tractor. Powerful, it has greater versatility in a wide job range. Called the Super 55, it's a 4-wheel, adjustable tread type. Wheel base is 73 inches and hood height is less than 51 inches.

Choice of 2 new engines for the 55—gasoline tractor engine and a full diesel engine. Has a 6-forward-speed transmission, including a super low gear that makes it possible to travel as slowly as ¾ mile per hour with sufficient power to handle about any job.

FORD MOTOR COMPANY announces newest model in its tractor line—the powerful "860" designed for live pto work. Ford's "live action" hydraulic system and exclusive 1-foot control for the live pto make work easy.

There's 3-point implement linkage and 30 per cent more power from the bigger Ford "Red Tiger" engine. A 5-speed transmission and Ford's exclusive Proof Meter permit accurate adjustment of speed. By pulling 3 bottom plows instead of 2, Ford tractors in their 800 series will do 6 days' plowing in 4 days.

WYATT MANUFACTURING COMPANY, Salina, Kan., announces the Jayhawk S&S Soil Saver, a tractor-drawn cropland and pasture renovator for large or small farms. Features a spinner that revolves at rate of 132 times per minute at 3 mile tractor speed, cracking ground in a radius of up to 6 feet, depending on model Soil Saver used. Creates an underground reservoir in the subsoil that holds water, reduces surface run-off and erosion and

conserves moisture for growing crops.

CATERPILLAR TRACTOR COMPANY announces greater horsepower and faster engine speeds for their D6, D4 and D2 Tractors. This will mean more production for owners, more profitable operation because of increased travel speeds and greater power, the Company says.

Diethylstilbestrol Feeding Endorsed with Limitations

A flood of inquiries from Virginia livestock producers about the use of diethylstilbestrol in fattening rations has brought forth a "yes, it's alright with certain limitations".

The following statement was issued after conferences between members of the V.P.I. departments of animal husbandry and biochemistry and nutrition:

"We believe that diethylstilbestrol will improve gains in steers fed a fattening ration for a reasonable period—100 to 150 days—in dry lot. We recommend that its use be limited to this specific condition, and that the daily intake should not exceed 10 milligrams per animal."

In the feed trade, the material is also known by the shortened names of "stilbestrol" or "stilbesol." Results of trials and recommendations have been announced by Iowa State, which has licensed a commercial chemical concern to manufacture the material. Several feed manufacturers have also been licensed to use the material in their protein supplement mixes, and they give specific directions as to how such mixes should be fed.

Other observations by the specialists are:

"Information is not available to show the effects of diethylstilbestrol feeding on the carcass grade, yield, and quality of fat cattle.

"With fattening steers fed good quality hay and silage, present information indicates that diethylstilbestrol in simple oil-meal supplements is as effective as when it is used in complex supplements containing added vitamins and minerals.

"There is no information as to the effects of rations containing diethylstilbestrol when used as a supplement for grazing steers. Its use under these conditions is not recommended at the present.

"There is insufficient information at the present to recommend the use of ration containing diethylstilbestrol in wintering steers or heifers, or (2) for fattening lambs. Such rations should not be fed to breeding animals—cattle, sheep, or swine."

Virginia Extension

Nitrogen Use Accentuates Need for Minerals

Recent research has proved that the increased use of nitrogen fertilizer makes it important to step up the use of minerals . . .

Condensed from Better Crops with Plant Food

Dr. C. J. Chapman, Soils Dept., University of Wisconsin

THE great increase in the use of nitrogen fertilizer by farmers in this country has been an almost phenomenal development in the past three or four years. Anhydrous ammonia has swept into the Midwest like a cyclonic storm.

At the close of the war in August 1945, the capacity for the production of synthetic ammonia in the nine gun-powder plants in this country amounted to some 700,000 tons (fixed nitrogen). Agronomists wondered if even 50% of this capacity would ever be used as fertilizer in the post-war period.

Today, nitrogen is being used on a scale that exceeds the most extravagant speculation of any who predicted this g i g a n t i c growth in nitrogen production and use as a fertilizer. Present capacity for the production of fixed nitrogen in this country now hits close to three million tons.

Ammonium nitrate as a source of low cost nitrogen has come into wide use on corn and other crops. In fact, the demand these past three or four years has greatly exceeded supply.

Farmers are now using another source of low cost nitrogen—anhydrous ammonia. This liquefied form of ammonia gas (NH_3) carries 82½% nitrogen. It must be held in rust-resisting steel tanks under pressure of from 150 to 200 lbs. per square inch. The application of this liquid gas calls for special and rather costly applicators. Injected or "knifed" into the soil, it is fixed chemically and held there until the soil warms up. At temperatures above 60° it nitrifies and becomes available to the growing crops or is

Reprinted by permission from Better Crops with Plant Food, Washington, D. C., January 1955

used by and built into the tissues of bacteria or fungi and thus held for later use when these bacteria and fungi decompose.

The great expansion in the use of nitrogen has accentuated the need for minerals in our soil. We must stress as never before the importance of lime, phosphate, and potash to back it up. In fact, there will be an increasing need for certain trace and secondary minerals in order to balance out fertility. Low cost nitrogen fertilizer has extended crop production horizons—but unless we balance out the fertility of our soils with both major and minor elements, we may see a general decline in the productiveness of the soils in this country.

This may be a good time to present some yield data that are of far greater significance now than when the work was conducted. It was 10 years ago that plans were made for an extensive program of fertilizer demonstrations in northern Wisconsin. This program of demonstrations came about as a result of a demand on the part of county agents in these northern counties for help from the College of Agriculture. "What's wrong with northern Wisconsin's agriculture"? This was the question that during the summer of 1944 was put to the administrative heads of the College. The initial step was a two-day conference at Ashland of administrative heads, including departmental chairmen as well as county agents and farm leaders from this northern area.

The livestock people offered the suggestion that there was much to be desired in the way of herd improvement. "Too many scrub cows! Poor quality feed," they said. They suggested a program of artificial insemination for the dairy farmers of this northern area.

The economics people voiced their opinions. "Cut costs or production! Increase the output of quality feed! Better cows and a greater diversification of farm income," they said.

The crops people summed up the situation in very few words: "Convert the weed-infested hay and pasture meadows of the area into good, high quality, protein-rich forage crops! Grow more grain and practice a system of shorter rotations!"

Professor Emil Truog, then chairman of the Department of Soils, elaborated on the basic fundamentals of soil fertility, lime, and fertilizers, and the importance of mineral-rich soils as a starting place in a program of crop improvement and the eventual development of better herds of dairy cattle. Without question, Professor Truog had hit upon the real and basic reason for low yields and poor quality of hay

and grain in that north country.

The first year we started out with nitrogen only on those old June grass or timothy quack meadows. The results were very good on some fields but on others just fair, and in some cases all it did was to green up the grass. There wasn't very much of any increase in total yield.

The second year, 1946, on one half of each acre plot, we backed this nitrogen up with an application of 0-20-20. The results were outstanding, in fact, spectacular. But which was it?—the phosphate or the potash that was responsible for the greatest increase in yield on those plots that received the 0-20-20 in addition to the nitrogen?

Some of my associates, who had consistently opposed the application of superphosphate as a topdressing on pastures, insisted that it was the potash in the 0-20-20 that was chiefly responsible for the phenomenal increases in yields of grass. So in 1947 we split our acre plots into three strips—one strip with nitrogen only, one with nitrogen plus superphosphate and the other received the complete treatment of nitrogen plus 0-20-20.

The results of our 1947 work proved without question that phosphate was important and would produce substantial increases in yield, but where potash was added, yields of grass or hay were hiked to even higher levels.

This piece of extension work in northern Wisconsin in the years 1945, 1946, and 1947 is highly significant now in the light of the recent tremendous development in the use of nitrogen fertilizers.

It is not surprising that with this background, the writer has been one of the leading advocates of balanced fertility in his program of pasture improvement. While I have talked and written much about 10-10-10 for pastures, I have recognized the fact that the mineral needs of soils vary and farmers must be guided in their use of fertilizer by regional needs, soil tests, and experiment station work.

But one thing I am sure of and that is the fact that this great increase in the use of straight nitrogen—whether it be ammonium nitrate, urea, or anhydrous ammonia—will pump minerals out of our soils at an accelerated rate. I shall continue to talk about the great potentials for low cost feed, food, and fiber production through the use of nitrogen fertilizer—but along with it, the use of adequate supplies of minerals—both major and minor.

The average hen lays 153 eggs per year. The national record is 306 eggs per year.

The Modern Farm Shop

Here's expert advice on how to plan your shop and use it to make and save money . . .

Condensed from The Young Farmer

Prof. Harold L. Kugler, Kansas State College

"MY SHOP is the most valuable building on the whole place. I figure I save enough there *every year* to pay for all my tools."

"I don't know what I would have done last fall without my shop. It saved me several days right at the most critical harvest time."

These are farmers talking—farmers from Maine to California, Minnesota to Texas.

What they are enthused about is a development that is showing signs of sweeping the country. It's the "coming out" of the modern, up-to-date farm shop.

Within the last two decades, the American farmer has become mechanized. Manpower and horsepower have been replaced by machines that will do anything from milk a cow to harvest a field of grain. The average farmer today couldn't begin to get along without his vast array of machinery—even if he wanted to. And of course, he doesn't want to.

But if machines have helped the farmer, they have also brought him a whole set of new problems. Machinery is expensive, both to purchase and to maintain. And sometimes, because of local soil or terrain conditions, brand new machines won't perform properly unless they are altered.

The machine that breaks down at a critical time in the farmer's operations can do a lot of damage. A self-propelled combine that develops an "ulcer" in its gear box can waste more time, cause more high blood pressure, and cost more money than any horse that ever threw a shoe.

As farm machinery becomes more complex, these problems magnify. Repair bills and loss of time can become a major hazard.

One way for the farmer to beat these problems is to learn

Reprinted by permission from The Young Farmer, 400 Second Ave. South Minneapolis 1, Minnesota

to do his own machinery maintenance and repair. This means he must have a farm shop because if he is going to do a good job, he needs good tools. He also needs an adequate place to do his work. He doesn't, however, need formal training.

The big advantages of farm shops are obvious: they are great savers of time and money. A farmer with a shop has a place in the winter to put his spare time to good use. He can check his machinery and catch the weak spots before he has a breakdown in the field.

If he has an inventive turn of mind, he can construct his own machinery and equipment for special needs. He might even find a source of extra income by doing repair work for his neighbors. And he will have licked the problem of any breakdowns that do occur because he can fix the trouble on the spot.

All of these things can be done with a *good* shop. The farmer working with inadequate tools is often actually wasting his time. For with modern machinery, work has to be done well or it simply won't last. And you can't do good work unless you have good equipment.

Many young farmers are frightened away from establishing a shop because of the expense of good shop equipment. *They shouldn't be. A farm shop doesn't have to cost a lot of money.* And money invested in the shop will soon be repaid in full and will return dividends for years.

There is always the question of how much the individual farmer can profitably invest in shop equipment. No set answer can be given for this because of the widely varying conditions from farm to farm. But a survey of Kansas farmers who have good shops showed they averaged an investment of 8c for every dollar invested in machinery. This figures out to $800 for $10,000 worth of machinery. And every one of these farmers felt he was getting his money's worth.

It doesn't mean you have to spend $800 to have a good shop, and it certainly doesn't mean that you have to buy all your equipment at once. The farmers queried had built their shops over a period of years, starting slowly with basic tools and adding other equipment as they could.

The important thing, in setting up your shop, is to work out a long range plan. Sit down and decide what kind of shop you want eventually. Look at the shops your neighbors have. Send to your agricultural college for bulletins on farm shops. Make a list of the things you want to have in your shop when it is completely equipped. And when you make this list, remember you will

probably be expanding your farming operation and will be acquiring more machinery over the years.

When you've come this far, make an inventory of the equipment you have on hand. Chances are that you already have a collection of hand tools, and you might have a small electric motor which will come in mighty handy in building your own shop equipment.

After you know what you want, and what you've already got, you're ready to start planning your shop. There are several things to consider. Let's take them up one at a time.

Location

Tools are of no use unless you have a place to work with them. There are a lot of places to put a shop, and the "best" location will vary from farm to farm. It often isn't possible—or even a good idea—to start by constructing a separate shop building. After you've worked in a makeshift shop, you'll get a lot of ideas you'll eventually want to work into your permanent shop.

So, to begin with, you can use a small empty corner of a big building. Try to locate it close to your machine storage building or your refueling area. Your shop doesn't have to be a showplace, nor does it have to be very large at first. It's nice to have an enclosed area big enough so that you can work on your machinery inside, but that's not essential.

You should, however, have a large working area just outside the shop. And this area should be well drained so that it won't get muddy. A concrete slab is ideal.

The inside of your shop *must* meet four requirements. First, it must have a source of electricity. Second, it must have a well lighted workbench area. Third, it must have ample wall space for shelves and cabinets. And, fourth, it must have an area where you can use a welder or forge without danger of burning down the building.

"Furniture"

You are going to need three basic pieces of furniture in your shop, all of which you can build yourself. The main item will be a good sturdy workbench. And you should have a battery of shelves for small items (bolts, nails, spare parts, etc.) Finally, you should have a tool cabinet or tool panel. If you plan to move your shop to a different location at a later date, you can make a portable workbench and construct your shelves and tool panel in sections so they can be easily moved.

Wiring

You are going to need both 230 volt and 115 volt electric service in your shop. You will need at least one 230 volt range outlet for your arc welder and several 115 volt plug receptacles for your electric drills and electric motors. You should, in fact, have two 230 volt outlets for your welder. One outlet should be near the welding area inside the shop. The other should be either outside the shop or just inside the shop door. This outside connection is necessary if you do any welding outside your shop.

A shop should always have plenty of overhead lighting. Accurate work demands good light —and so does shop safety. A good idea for a workbench light is to suspend a projector flood lamp over the work area. In addition to giving plenty of light, the bulb will warm your hands.

Equipment

Equipping the shop is going to be your biggest item of expense, so it pays to plan your equipment build-up carefully. There are two basic types of shop tools—hand tools and power tools.

Hand tools are not a big problem because most farmers have a pretty good collection of wrenches, hammers, pliers, chisels, etc. There may also be a vise and an anvil around the farm somewhere.

Power tools are in a completely different class. Not many farmers have enough power tools, nor are they sure what kind of power tools they will need in their shop.

There are three main classifications of power tools—the welding tool, the drilling tool, and the grinding tool. A good farm shop should have at least one piece of power equipment in each of these classifications. In the average shop, the most suitable tools in each class would be as follows:

Welding—electric arc welder.

Drilling—½ inch portable electric drill with a stationary press mount.

Grinding—power grinder driven by an electric motor. (Another grinding tool gaining favor is the portable right-angle combination sander-grinder-buffer equipped with a flexible disc grinding wheel. This tool is more versatile than the conventional grinder.)

With these three tools in your shop, you can perform almost any ordinary farm repair job and can also expand your shop by constructing additional shop equipment. Here are just a few of the items you can make with these tools: sickle grinder, anvil, power hacksaw, compressor stand, exhaust fan, barrel stove, tool

cabinets. And there are many more.

Common sense and a lot of practice will carry the average farmer through in the use of most of his tools. There are some skills such as welding, however, which almost require some instruction. The best place to get this training is in the high school shop. There are thousands of welding machines in vocational agriculture departments all over the country, and the Vo-Ag instructor will usually be happy to help you get acquainted with a welder.

Some communities, however, are just getting their shop programs under way, and there are no welders readily available. If you live in one of these areas, don't give up. You can still learn to weld with a little effort.

There are several good books available for the beginning welder, and in almost every community there is someone who can weld and will give you a few hours of instruction. The dealer who sells welding machines will most certainly be happy to show you how to operate one.

If you can find someone to give you a start and then follow the book of instructions, you'll soon be welding with the best.

Once you've mastered the skills, and have started to build up your equipment, you're on your way. You'll find yourself tackling bigger and bigger repair jobs. You'll be building wagons and feed bunks. You'll be remodeling farm machinery that doesn't quite suit you. You'll be saving money. And you'll be enjoying yourself while doing it.

Minnesota Tests Fertilizer Merits

The results of tests to determine the merits of fertilized versus unfertilized alfalfa-brome grass pastures were recently reported by the Minnesota Experiment Station at Rosemount where the tests were made with 35 Montana-born steers.

The daily gain per steer on the fertilized pasture was 1.74 pounds compared with 1.14 pounds on the unfertilized pasture; the fertilized sections of the pasture gave 177.2 steer days of grazing per acre, compared with only 121 days for the unfertilized sections. The fertilized sections received 500 pounds of 0-20-20 per acre in the spring of 1952. The steers gained a total of 3,477 pounds on the fertilized pasture and those on the unfertilized pasture only 1,557 pounds. The value of beef produced per acre was $66.46 on fertilized pasture compared with $29.06 on the unfertilized pasture.

Agricultural Leader's Digest

Forage Crop Irrigation

Cost of forage crop irrigation should be carefully figured to see if it will pay . . .

Condensed from New Jersey Agriculture

R. B. Alderfer

THE growth of forage crops is so closely associated with soil moisture supply that irrigation seems to be the answer to the hay and pasture production problem.

Results of many studies of the amount of water required by different plants to produce a pound of dry matter show that forage crops are among the least efficient users of water. The production of one ton of dry matter, whether it be bluegrass or alfalfa, requires the use of at least 7 or 8 acre-inches of water. This introduces the problem of a suitable supply of water for supplemental irrigation.

Assuming that a permanent source of water is available, an equally important problem still remains. How much does it cost to put an acre-inch of water on the land at the right time and at a rate that the soil can absorb? Cost will vary with a great number of factors, but it is not likely that many irrigations can be made for less than $5 or $6 an acre-inch of water.

The amount of water required to produce an increase in growth will vary with the season and how long the dry period lasts, but probably not less than 3, and more likely 5 acre-inches will be used.

How much is irrigation of forage crops worth in terms of an increase in yield of dry matter? Irrigation experiments conducted in New Jersey, Pennsylvania and New York within the past five years show a remarkable similarity in terms of dry matter production from irrigation. Five hundred to 800 pounds of dry matter per acre seem to be the average annual increase attainable from irrigation.

With first quality hay available at $60 per ton, irrigation might be expected to produce about $15 to $20 worth of forage an acre. Balanced against a

Reprinted from New Jersey Agriculture, New Brunswick, N. J., Nov.-Dec., 1954

cost of application of not less than $20, irrigation of forage crops is not an economical proposition.

There are many ways to increase the production of high quality forage on most of our agricultural land which offer greater promise than irrigation. Adequate fertilization and liming, good seed of adapted species, proper harvesting, insect control, and periodic renovation or renewal of the stand are management practices of proven value.

Instead of facilitating the management problem, irrigation can, and usually does complicate it. Moist soil compacts easily. The more compact the soil, the slower the rate of water absorption. The application rate of irrigation water is determined by the intake capacity of the soil. Most pasture soils will not take in more than ¼ or ½ inch of water per hour. Danger of loss of water by runoff is always present. Grazing management, which allows for as little soil compaction from trampling as possible, will help to maintain a much higher infiltration capacity. There is always the possibility of getting a good soaking rain right after an irrigation. This increases the loss of soluble nutrients by leaching.

Forage crop irrigation can be of value in extreme emergencies. It can be used to get a new seeding off to a fast start during a prolonged dry period. It can also be the means of saving a crop where drouth is so severe that plants may die because of an absolute lack of water. Most forage crops, however, have remarkable recuperative powers and will begin to grow when weather conditions become favorable. Where no hay can be purchased and irrigation facilities are available, even 500 pounds of forage per acre from irrigation can mean the difference between keeping one's animals or selling them.

The need for and value of irrigation on many vegetable crops is pretty definitely established. If such irrigation equipment is available for use on forage crops during emergency periods, the practice may be justified since many of the overhead costs can be absorbed by, or shared with, the vegetable crops.

There is evidence of irrigation increasing forage crop yield as much as one ton an acre. Such increases are obtained during extended drouth periods where a crop has to make all of its growth without any effective rainfall. This is the exception rather than the rule for most growing seasons.

Before one decides to try to eliminate his dry weather problem with irrigation he should give very serious consideration to ways and means of making

the best possible use of the more favorable weather conditions he does get during the growing season, and of making the most efficient use of soil moisture during the drouth period.

Most of the recommended forage crop management practices are good water conserving measures because they had to be. The chance of wide-spread adoption of any new soil and crop management system is exceedingly small if it does not make for the more efficient use of water than the system it is to supplant.

Dairy Price Supports

Secretary of Agriculture Ezra Taft Benson announced that current dollars-and-cents support prices for manufacturing milk and butterfat and current buying prices for butter, cheddar cheese, and nonfat dry milk will be continued through the 1955-56 dairy marketing year which began April 1.

The support prices are being continued at $3.15 per hundredweight for manufacturing milk and 56.1 cents per pound for butterfat. These are an estimated 80 per cent of the modernized parity equivalent price for manufacturing milk and 77 per cent of the parity price for butterfat, both as of early 1955. These same dollars-and-cents prices represent a higher percentage of parity for the 1955-56 marketing year than the old 75 per cent level, because of a reduction in the parity index and a modernizing change in the method in effect for calculating the equivalent parity price for manufacturing milk which was announced in April 1954.

Dairy product purchase prices set to reflect national average support prices for manufacturing milk and butterfat will be continued as follows: Butter, U. S. Grade A or higher, Chicago, San Francisco, Seattle, 57½c per pound, and New York, 58¼c per pound; (U. S. Grade B butter is two cents less per pound.) Cheddar cheese, U. S. Grade A or higher, 33¼c per pound; Nonfat dry milk solids, U. S. Extra Grade, Spray process, 16c per pound, and Roller process, 14¼c per pound.

Secretary Benson said, "We are beginning to realize the objective set a year ago of balancing milk production with the consumption of dairy products. In December, our support purchases were the lowest in two years. Milk production has leveled off. During recent weeks, we have observed more strength and stability in our dairy markets than in a good many months. Under such conditions, with dairy supports at the same level for another year, we should move even closer to our goal."

NO SHOVEL NEEDED!!

New granary and feeding system takes the hard labor out of beef cattle feeding . . .

Condensed from Ohio Farmer

Delmer E. Groves

BIG JOB on the Walter Mautz farm, just as it is on your farm, is getting crops into storage. Once that's done, feeding becomes a routine chore for Walter, his son and partner, Charles.

This is true because of the new feeding system they're devising for their Marion, County, Ohio, livestock farm. Most years, around 150 head of good cattle are fed to top finish. Hogs follow the cattle and some sheep are kept.

When the system is completed, a flick of the switch will deliver feed from storage right into the bunks where the cattle are fed. Of course, there'll still be other work such as bedding to do.

This feeding system really started many years ago out in the Mautz farm woodland. The trees which had been growing there were cut down when building was started a year or so ago.

Mature trees were sawed out to become the framework for a new grain storage building so that one corner of it was just 30 feet from the corner of the barn. This arrangement allowed the storage to be out in the open for free air movement and to allow easy access to the center drive-through. At the same time, it was close enough to allow direct feeding in the barn.

On the outside, this new grain storage looks like the elevator on many Ohio farms—but it's different inside. The 30-by-70-foot structure was arranged to prevent backache. One end provides storage for 6000 bushels of ear corn and the other end has bin space for 2500 bushels of small grains.

A 37-foot bucket elevator takes grains dumped in the elevator pit overhead. Here they can be moved the length of the building by a drag link conveyor. It runs over a 10-inch board with sideboards to form a trough. Mautz has a home-built affair on the end of the elevator to route the corn to either side of the drag.

Tunnels were built underneath

Reprinted by permission from Ohio Farmer, Cleveland, Ohio

the ground floor. They are used to carry the drag link conveyors which empty the bins, and for forced air drying of the grain through the slatted floor. Also beneath the floor is a feed grinder so that ear corn can be conveyed to the end of the bin and dropped by gravity into the grinder.

When the system is complete, the other bins can be emptied into the grinder in the proportion desired. Then the ground chop is routed to the elevator and taken overhead. From here it is dropped into a round "blower pipe" which drops the grain into the end of an auger box at the corner of the storage.

This is the overhead auger which connects with the barn. It extends through the corner of the granary roof and moves the feed over into the barn. Here an auger moves the feed directly down the continuous bunker on one side of the feeding barn.

By pulling an overhead rope the feed can be shunted to the other side of the feeding barn. It moves overhead past the barn door and down the feed bunker on the other side of the barn. This is all done by the auger syster driven by electric motors with the help of universal joints and nine discarded Chevrolet transmissions.

Drops from the overhead auger box are placed every few feet and they too are made of lumber, rather than the burlap or canvas sometimes employed. When the feed trough fills at the point of the drop, the feed backs up to the overhead box and the auger then pushes the feed past this drop and on to the next opening.

The system was built at a minimum of expense. The whole thing was devised by Walter and his son, Charles, with some help from Neighbor Paul Kroner and Kenneth Battles, extension agricultural engineer.

High-quality hay is baled on the Mautz farm. It's elevated into the mows and fed by throwing into portable square hay feeders which are placed directly below the mow. That cuts hay feeding chores to the bone.

Before this set-up was built, Walter and Charles had to move corn and other grain from the bins into the wagon and then to the farm feed mill. Again it was shoveled into the mill. The tractor had to be lined up for grinding. The chop was taken by trailer to the bins where another shoveling operation was required. All this work took extra help.

When Walter and Charles get their new idea completed, it will mean that the two of them can handle all of the chores for 150 head of steers or more, plus the pigs produced by 13 to 20 sows.

Big Cows Are Best

When it comes to using roughage efficiently, big dairy cows are best . . .

Condensed from Wisconsin Agriculturist and Farmer

Dan Kasen

SUPPOSING you were going out to buy a cow, and found one that caught your eye. One of the first things that you would want to know is her production record. That is important.

But something that is becoming more and more important is—how did she make that record? Did she do it on high priced concentrates? Or did she make a good record by eating the lower cost roughages.

As long as price supports are in favor of the grain grower, the average dairyman needs cows that can do well on forage crops. And roughage capacity of a cow is a way to pick a cow that may be a money maker.

Built to Eat Roughage

By any standard the cow is the best consumer of roughages. She has a big paunch that can hold up to 50 or 60 gallons. And that big paunch is the reason she can do so well on the lower cost feeds—because roughages are so much more bulky compared with grains and other concentrates.

Hay has only two-thirds the energy value of grain. So the roughage eating animal has to eat a lot of roughage to get enough food to do well.

How much roughages can you safely feed a cow?

Some dairy scientists at the University of Purdue made tests with grass silage. They were able to get a big Holstein to eat more than a half a ton of grass silage a week. This feeding schedule lasted for over five months. The big cow received no other feed. During this time she produced an average of 32.8 pounds of milk a day and gained 1.76 pounds for each day she was on test.

Reprinted by permission from Wisconsin Agriculturist and Farmer, Racine, Wisconsin

In one day alone the cow ate 191 pounds of grass silage.

Ate Top Quality Silage

One of the reasons why this cow did as well as she did was because it was early cut grass silage—a mixture of grass and legumes. To make the silage as palatable as possible they mixed 80 pounds of molasses to each ton of grass. This Holstein wasn't a noted high milk producer. Another cow might have done better, might have produced more milk but then wouldn't have gained as much weight.

The cows on the Morris Cohen farm in Waupaca county Wisconsin, are big roughage eaters. The 56-head herd eat up four big silos of silage over the winter. Sixty acres of hay isn't enough so he has to buy hay besides. And these cows produce well on this kind of feed.

In another test at Purdue University, they checked on the production of a cow who ate up to 50 pounds of hay a day. The hay was choice, early cut and leafy. On this hay alone the cow produced an average of 33 pounds of milk a day. And she gained 100 pounds.

No matter how good a cow you have, no matter how much roughage she ordinarily consumes —she can't produce a lot of milk if the roughage is of poor quality. One reason is the cow can't eat as much if the quality is poor.

Poor Roughage Slows Digestion

N. N. Allen, dairy expert at the University of Wisconsin, says the reason cows eat less of the poorer roughages, like stemmy or rained on hay, is because this kind of roughage digests more slowly. Poor roughage stays in the paunch longer. And slowed-up digestion means slowed-up consumption.

"A reasonable amount of concentrate to bring that protein ratio up is good. But we like to balance those concentrates with lots of hay and silage," says Elmer Scheriner, Wood county, Wisconsin.

Besides, you may be making less money even if you are producing a little more milk. The cow that can make most of her milk from roughages is the money maker.

There is a danger, on the other hand, of just depending on roughages to fill the bill when they aren't of the highest quality.

Extensive experimental work shows that the bacteria and other organisms in a paunch need a balanced ration all their own in order to work efficiently. Roughages that aren't the very top quality need to be balanced with grain mixtures and concentrates.

More About Social Security For Farmers . . .

Important facts concerning the newly amended Social Security Law as it applies to farm operators, individual farm contractors, and farm workers . . .

Condensed from Indiana Farmers' Guide

IF YOU are a farm operator, independent farm contractor, or farm employee earning more than $100 a year from one employer, you are now included under the federal Old Age and Survivors Insurance program. This inclusion is compulsory. The two major changes in the 1954 Social Security law relating to farmers affect an estimated 3,600,000 self-employed farmers and about 2,100,000 additional hired farm workers. They were effective Jan. 1, 1955.

Previously, farm operators were specifically excluded from social security taxes, and many farm workers who did not work regularly throughout the year for one employer were not covered. All farm operators and independent farm contractors, such as custom harvesting and custom plowing contractors, whose net earnings are $400 or more during their regular reporting year are now brought under the OASI program on a compulsory basis.

If you are a self-employed farm operator with earnings of $400 or more in a year, your first step is to get a social security card, unless you already have one. The place to get it is your nearest Social Security Office. There is no charge. If you once had a card, but lost it, tell your Social Security Office that you want a duplicate.

Report First in 1956

You do not report or pay a social security tax on your 1954 earnings. Early in 1956, make a social security report of your 1955 earnings and pay the tax on them. This report is part of the income tax return.

It is important that you show your social security account number on your report, as that num-

Reprinted by permission from Indiana Farmer's Guide, Huntington, Indiana

ber identifies your individual account and makes it possible to credit your account correctly. Your benefits are figured from this account.

The amount you report is your net earnings — or profit — after you subtract your farm expenses from your receipts. But if your total receipts are $1,800 or less, and you report on the cash basis, you have the choice between reporting your actual net earnings or reporting half of the total receipts. You can report either way.

If your total receipts are over $1,800, you must figure your actual net earnings. If these net earnings are less than $900, you may report either the actual amount or $900.

If You Work for Others

If you do farm work for others and get cash pay of $100 or more in a year from one employer, you must have a social security card. If you have never had one, or if you had one but lost it, get in touch with your nearest Social Security Office. They will give you a card without charge. Show your card to the person you work for, so that he can copy the name and number from it for his records.

Your employer will keep 2 per cent of your cash pay for social security, add the same amount as his share of the tax, and send the total to the Director of Internal Revenue once each year, with his social security report.

If your cash pay from farm work for one employer is less than $100 in a year, he does not report your earnings and there is no social security tax. Also, if you earn $75 in a year from one employer and another $75 from a second employer, these wages would not count toward social security. But—if you earn $100 from one and $150 from the other, both employers will report your earnings for social security, and you will get credit for the total.

Whenever your pay from any farm employer is less than $100 in a year, he should return to you any amount he took out of your pay for social security for that year.

Who Reports for Tenants?

If your farming is done on land belonging to someone else and you are not paid a regular cash wage for your work, you may be in doubt about whether you are self-employed or an employee for social security purposes. The answer depends on the arrangement under which you farm—the agreement between you and the land-owner.

Some general guides are given below, but in case of doubt, get in touch with your nearest Inter-

nal Revenue Office or Social Security Office.

1. If you rent or lease land, for either money rent or any other kind of rent, and farm it on your own, then you are self-employed for social security purposes. You make out a social security report for yourself, just as any other self-employed farmer, once a year and pay the social security tax if your net earnings are $400 or more for the year.

2. If you farm on shares, you may be either an employee or self-employed for social security purposes, depending on the agreement and arrangement under which you farm. If the share arrangement is that you pay the land-owner a share of the crop as rent for the land, you are ordinarily considered self-employed for social security purposes. You make out a social security report for yourself, just as any other self-employed farmer, once a year and pay the social security tax if your net earnings are $400 or more for the year.

On the other hand, if the share arrangement is that the land-owner, or other operator of the farm, pays you a share of the crop, or of the proceeds from it, as pay for your work, then you are considered his employee. If your share is in the form of cash pay amounting to $100 in a year, the person you work for is responsible for deducting 2 per cent of your pay, putting the same amount of his own with it, and sending this amount with a social security report to the Director of Internal Revenue.

If your share is paid in any form other than cash, it does not count for social security purposes and your employer will not report it.

Your Right to Benefits

To become entitled to old-age insurance payments, or for your family to become entitled to payments in case of your death, you must have worked under social security for a certain period of time, depending on the date you became age 65 or die.

Generally speaking, your work under social security cannot be less than 1½ years and need not be more be more than 10 years in any case. If you already have some social security credit, any credit you earn under the new law will be added to your present record.

To claim benefits, or to get more information about them, get in touch with your nearest Social Security Office. The people there will be glad to explain your rights and to give you all the help you need in claiming benefits.

How to Pay Social Security Taxes

Until 1960 the social security tax on wages is 2 per cent each

for employer on earnings up to $4,200 a year. The self-employed person pays 3 per cent on his own earnings up to earnings of $4,200 in a year. Examples:

1. A farm hand who earns $1,200 in a year will have $24 tax deducted from his pay, and the employer will turn that in, with $24 of his own to match it.

2. A farm operator who makes $2,000 profit in a year will pay $60 social security tax.

Social security taxes are not collected by your local Social Security Offiice but by the Internal Revenue Service—the same agency that collects income taxes.

For instructions on whether you owe or do not owe social security taxes, or about how and when to pay them, get in touch with the Internal Revenue Service office nearest you. If you do not know the address, your postmaster can give it to you.

Compare Hay and Corn Silage Value for Lambs

Lambs gained at about the same rate and cost per pound of gain on alfalfa hay or corn silage as their only roughage in a 70-day western Minnesota experiment.

Results indicate that corn silage can be fed fattening lambs as their only roughage. However, although corn silage-fed lambs gained as fast and as economically, they didn't have as high a carcass grade and were evaluated at 25c per 100 pounds less than lambs fed alfalfa hay as roughage.

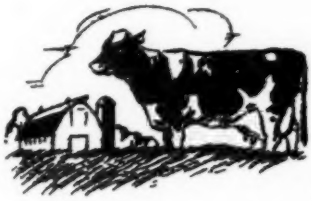
Hay-fed lambs each ate about 1.5 pounds per day and those fed corn silage ate about 2.3 pounds per day. Alfalfa hay was figured at $16 a ton and corn silage at $6 a ton. The alfalfa hay-fed lambs ate about the same amount of concentrate—shelled corn and soybean oil-meal—as the corn silage-fed lambs.

The researchers say these results indicate that the feeder who can produce good corn silage efficiently will find it a profitable roughage for fattening lamgs.

Minnesota Extension

VETERINARIAN'S NOTEBOOK NO. 15

Mastitis—One of Our Biggest Problems



How to prevent and treat mastitis is just as big a problem in England as in this country . . .

Condensed from Farmer and Stock-Breeder

"I VERY well remember you asking a question about mastitis at that discussion group last winter. I told you there was no wonder drug that would cure all cases, but it doesn't seem to have stopped you from treating this quarter with the wrong stuff for three days. Ah well, we live and learn." That's the trouble about mastitis.. Farmers won't realize that many different types of bacteria can be concerned with mastitis, and there is not a drug yet that will cure the lot.

A few years ago it was sulphonamide that was being poured down cows' throats by the pound —"I've been treating 'er with that white powder stuff, but it doesn't seem to be doing any good"—was a common greeting.

Now of course it is penicillin, if there are any "tubes" left over from the last case (and they have usually been left on top of the hot sterilizer and are useless anyway!) they are squeezed into the first bad quarter that occurs, irrespective of the germ concerned. It is not only a waste of money and time but it's downright foolish too.

Adequate Doses

Penicillin must be given in adequate doses at proper intervals if it is going to do any good at all. If you give too small doses at irregular intervals you are only helping to produce a strain of bacteria which are penicillin-resistant and there's no good in that.

Let us get this quite straight from the start. It doesn't matter whether it is sulphonamide, penicillin, streptomycin or anything else. None of them will cure all

Reprinted by permission from Farmer and Stock-Breeder, Dorset House, Stamford Street, London, S. E. 1, England

cases of mastitis. The action of each of these fine drugs is limited to certain bacteria, and if the mastitis is due to another type of bacteria you might just as well use "tap water"—you'll get the same result—only a lot more cheaply.

The bacteria commonly concerned with mastitis are streptococci, staphylococci, corynebacterium pyogenes (there's a fine name for you!—this is the cause of summer mastitis in dry cows) and the tuberculosis bacterium. Not only can you get acute and chronic types of mastitis due to these four bacteria, but you can get mixed infections too, and the streptococci and staphylococci can exist in various strains as well. So you see what a headache mastitis really is.

Job For The Vet

The diagnosis of mastitis is a job for veterinary surgeons, and in numerous cases depends on the examination of a milk sample under the microscope. It is no good anyone pretending that he can be 100 per cent correct from naked eye examination of milk in a strip cup. It can't be done.

A correct diagnosis quickly made and the right treatment given within 24 hours usually means a good chance of a complete cure except, of course, in T.B. mastitis, where treatment is out of the question. What is the market value of a three-quartered cow? The loss would easily pay your vet's fee—it's just common sense.

These germs or bacteria are present in the atmosphere and in dung and dirt all the time. It has recently been shown that the udder tissue of heifer calves can harbour certain types of bacteria which are waiting until the animal calves and something "upsets" the udder to produce mastitis.

What are the conditions which render a cow's udder more likely to become infected by these germs which are around us always? First and foremost bad dairy technique is, in my opinion, the chief predisposing cause of mastitis—failure to wash the udder and teats before milking, failure to dry off the udder and teats after washing, faulty cleaning and sterilization of dairy equipment, failure to "dip" milking units between cows, allowing machines to pulsate too fast so damaging the lining of the teat, allowing machines to stay on too long, dirty hands, dirty habits like wet hand milking, insufficient stripping, rough stripping—all these things come under this heading.

Predisposing Causes

Add to these the fast driving of cows with heavy, swaying udders, badly constructed standings allowing the udder to lie in the

dung channel when the animal lies down, "over stocking," damage to teats such as tears and bruises, and last but by no means least, the failure to use a good fly repellent in the cowshed, and you have the more important predisposing causes of mastitis.

The individual cases of acute mastitis are bad enough with their hot inflamed quarters, high temperatures, yellowish, whitish or orange-tinted clotty discharge, depending on the bacteria concerned, but from an overall economic aspect it is the slowly developing chronic cases of mastitis which are the most important.

Examine Carefully

In such cases changes in the milk are not noticed in the early stages, the clots may be so tiny as to pass unnoticed unless the strip cup is examined most carefully, and it is not until hardening of the quarters has commenced that the cowman or farmer is aware that something is amiss. By this time many of the herd will have become infected and you have a major problem on your hands.

It may take months to rid a herd of such an infection, and the milk cheque will have dwindled appreciably in that time. Watch out for this type of mastitis. The constant and diligent use of the strip cup, together with thorough cleanliness is your only safeguard.

Summer mastitis which occurs in dry cows and heifers turned out to grass is a condition all on its own. Its onset is sudden, in some cases a matter of hours, and in some cases it is a matter of saving the cow's life. The loss of the quarter is inevitable. Once you have seen a case with the udder going purplish in colour and finally cold and dead and the characteristic stinking discharge from the teats, you will never forget it.

In my experience it is more common in certain areas than in others, and if you live in an area where it does occur, then consult your vet about preventive inoculation and sealing off the teats of dry cows and in calf-heifers before turning them out to grass where they are exposed to the risk.

Mastitis is one of the biggest problems of the dairy industry and the veterinary profession. You as stock owners and cowmen can do a lot to prevent it. If you get a case, isolate the cow at once and give your vet something like a fair chance to cure it.

During the war, one government agency is said to have urged farmers to "plant every acre, no matter how small". Another suggested to a farmer that he keep his steers for "breeding stock".

New Mulches Increase Garden Yields

Recent experiments in Kentucky prove the value of aluminum and plastic mulches for vegetable crops . . .

Condensed from California Farmer

E. M. Emmert

UNLESS a grower has adequate water supplies, his garden venture is about as much of a gamble as throwing up a coin. He has even less than a fifty-fifty change of coming through with a good crop.

Through the use of perforated aluminum foil and polyethylene plastic mulches to cover furrows on experimental plots at the University of Kentucky, this gamble was taken out of gardening. This was done by using only about one-third the amount of water that is needed for overhead sprinkling. If the grower has only a small water supply, this means a lot.

Water bills for the gardener using city water will be one-third as much. Mulches also make natural rainfall go much further by retarding evaporation.

The furrows were made about three to four inches deep and 10-12 inches wide. In some cases, the crop was planted in single rows in the bottom of the furrow, and aluminum or polyethylene plastic was placed on each side. The best system, however, was where the furrow was lined with foil or plastic and the rows planted on each side of the furrow. T-shaped slits were cut two to three feet apart in the bottom of the furrow, with the stem of the T pointed upgrade into the flow of water.

On steep grades, the holes were closer than on nearly level land. The water was put into the furrows by grated pipe. The flow was regulated so that the soil under the mulch was thoroughly soaked in an hour's time on 200-foot rows to a depth of 24 to 30 inches. The three to five feet of unmulched soil between the lined

Reprinted by permission from California Farmer, Los Angeles, California

furrows was dry as a bone, but beans and tomatoes flourished as if there was no drouth. Much better results were obtained than with rotary sprinklers and one-third the water was used.

Aluminum foil keeps the soil temperature 10 to 15 degrees cooler than bare soil and the reflected light is beneficial to growth.

Black polyethylene film was cheaper and the seeds could be jabbed through with a jabber, which gave better weed control. It warms the soil up to 10 to 15 degrees above bare soil. For this reason it is best in cool weather, while aluminum is better for crops in hot weather.

In 1952, a double row of Kentucky Wonder beans 200 feet long on each side of an aluminum foil-lined furrow returned at the rate of $2625 per acre. The minimum foil cost (material only) was about $100 an acre when used in large amounts. On plots not irrigated, no marketable beans were harvested. The high return was due to the fact that most beans were a failure and the price was high. In 1952 the yields of tomatoes were also greatly increased by furrow irrigating.

In 1953, rain came at the critical time and the yield of Kentucky Wonder beans was not increased much by irrigation, either with furrows or rotary sprinklers. However, the mulched furrows again paid off in a big way because the beans on the mulched furrows were free of disease spots and those kept wet by overhead rotary sprinklers were almost completely unmarketable due to disease spots and rust. In this year the yield of tomatoes was not increased so much by irrigation, but non-irrigated, mulched plots gave a 45 per cent increase over non-irrigated, non-mulched plots.

In 1954, aluminum-lined furrows produced 598 bushels of Kentucky Wonders per acre on the average. Again, the non-irrigated check did not produce any marketable beans. However, this year accurate yields on furrows watered without mulch were kept. These plots yielded 478 bushels per acre. This means that for approximately the same amount of water used, the mulch caused an increase of 120 bushels per acre. The beans sold for $5.00 a bushel, so the income due to mulch was $600. The mulch used over furrows about five feet apart cost about $130 and the return was $470. This does not figure the cost of laying the mulch, but weeds were fully controlled in the furrows and the elimination of weeding should offset the cost of laying. Another crop of Kentucky Wonders planted later in this same year returned very closely what the

earlier crop had.

Another remarkable response in 1954 due to mulching was in the yield of cucumbers. At the first picking, 1960 pounds per acre were picked from mulched, irrigated rows. The total yield was about four times greater than on control plots. In 1954, tomato yields were also considerably higher and quality was better on irrigated, mulched plots than on irrigated, non-mulched plots.

Soil Fertility Does Not Change Food Value

Milk is milk and wheat is wheat—whether it's produced from unfertile or fertile land.

But Michigan State College researchers remind that it takes twice as much unfertilized land to produce the same amount of milk or wheat that can be produced on fertile soil.

That is shown by a ten-year nutrition study conducted at Michigan State in cooperation with the National Dairy Council and the American Dairy Association. The research is nearing completion.

It has revealed that soil fertility does not change the composition or food value of crops. If a cow's ration is deficient in protein or minerals, milk production will decrease but the composition of the milk will remain the same.

Michigan State researchers found, however, that it was impossible to grow high-protein forage crops like alfalfa and clover on the unfertile soil. So they had to grow grass forage—brome and timothy—on both the fertile and unfertile soil to carry out the experiments.

Although the long time experiment shows that crops grown on unfertile soil are just as nutritious as those grown on well-fertilized land, Michigan State College researchers make this recommendation: Lime, if needed, and substantial quantities of fertilizers are the best investment a farmer can make today.

Michigan State College

To Dry Hay Faster, Crush It

By running hay through a crusher right after it is cut, the Wyoming Experiment Station reports that it can be dried to 25 per cent moisture in half the time. Other advantages resulting from hay crushing: More palatable; preservation of carotene because of shorter exposure to the sun; and reduced chances of losing quality because of rain.

DRIER FAN VENTILATES DAIRY BARN

Off-season use for hay drying fan proves a profitable practice on many farms. . .

Condensed from Electricity On The Farm

W. H. Smith

EACH year more farmers are using forced-air hay drying equipment. Almost without exception, these farmers are pleased with the high quality hay they have cured and the resultant increased production from their herds. Their drying equipment, basically a motor and fan, has frequently served the second purpose of drying corn as well as hay. And some are using the motor, alone to operate other pieces of machinery. That just leaves the fan idle during the winter. Even this can be changed to give year-round use of equipment.

In general, farmers who own hay driers have 10 to 20 or more head of dairy or beef cattle. This many cattle in a barn create a need for barn ventilation. Controlled ventilation is a farmer who owns a hay drier has in his possession a potential barn ventilating system.

The conversion of a hay drier to a barn ventilator is accomjob for an electric fan, and any plished by turning the fan around to exhaust air from the barn. The speed of the fan is reduced to deliver the proper amount of air for the size of the herd. In many instances this job can be done quite simply with very little labor or cash.

Harold Bittner, registered Jersey breeder near Danville, Ohio, now ventilates his dairy barn with the 36" propeller type fan he used to dry hay. To convert this unit the following steps were taken:

1. The main air distribution duct in the hay mow was sealed by a door 6 feet from the fan. Then a 2' x 4' opening into the dairy stable, below, was made in the floor of the duct.

2. The fan was turned in place so that it would blow out instead of in.

3. The 5 hp motor was disconnected and replaced by a ⅓ hp motor, bolted directly to the fan frame. (The larger motor is now being used on a 1 ton feed mixer.)

Reprinted by permission from Electricity On The Farm, New York City, November 1954

4. Pulleys were installed to turn the fan at 500 rpm. At this speed, it delivers about 7200 cubic feet of air per minute. This is about right for a 36 cow herd in Central Ohio.

5. A set of louvers was installed over the fan outlet to prevent back drafts when fan was not operating.

6. A thermostat was mounted in the barn and wired to turn the fan on or off as barn temperature varied. Thus, the temperature was maintained between 45 and 50 degrees.

These six easy steps converted this hay drier to a barn ventilator. Approximately $90 covered the cost. The fan is doing a wonderful job of exhausting moisture and stale air from the barn and eliminating sudden temperature changes. Mr. Bittner reports his barn is now a much more pleasant place for himself, as well as the cattle. What's more, the fan, which paid for itself, curing hay, is now paying a bonus. Mr. Bittner says it will only take about an hour to change the fan back when haymaking time arrives again.

Some fan manufacturers are now selling a package unit consisting of the small motor, belt, pulleys, thermostat, and outlet louver, which makes such a conversion quite simple.

Several Effective Fly-Bait Materials Now On The Market

When flies did the seemingly impossible and developed a resistance to the modern miracle insecticide DDT, agricultural scientists scurried back to their laboratories to find another and better method of killing the familiar pest.

Fly baits, combining an old principle with the use of new chemical insecticides, are proving to be the best means of meeting this problem. Several fly-bait materials that are effective in killing resistant flies are now on the market, report entomologists.

Malathion and diazinon, two new insecticides that are good for this purpose may be bought separately or in prepared fly baits. Either way, directions for use will be supplied by the manufacturer and should be carefully followed, the entomologists say.

Another effective chemical, Bayer 13/59, is available only in a prepared bait (Dipterex). All these materials are poisonous to human beings and animals and should be handled with due precautions. Diazinon is currently not approved for use in dairy barns. Several other chemicals have given excellent experimental results but are not yet available commercially.*VPI Agricultural Newsletter*

Grow Grass by Keeping Cover

Tests show how growing and dead vegetation effect soil penetration and influence forage production. . .

Condensed from The Cattleman

R. M. Milhollin, Soil Conservation Service

QUANTITY of growing and dead vegetative cover on rangeland materially influences the rate at which moisture penetrates the soil. This was shown by tests of moisture penetration into the soil made by Soil Conservation Service personnel at Seymour, Texas after six inches of rainfall in October 1953.

Typical of what was learned are the results on the L. R. Burns ranch. Moisture pentrated into the soil only 9 inches where the cover was 500 pounds per acre, 24 inches where there was 1500 pounds of cover, and 32 inches where the cover was over 3000 pounds per acre.

Green Grass In March From October Rainfall

Green grass in March 1954—30 days before the first grass growing rain, that is what happened on the Burns ranch this year where moisture was stored two feet deep in the soil last October. Associated with high plant vigor and minimum evaporation. Where the cover was best, soil was moist to the surface in March.

High quality native range fits into Burns' livestock operations. He runs yearling stocker cattle, puts them on native grass in the fall, on wheat during the winter, and back to native grass in the spring. The cattle are moved to market about June 1. This kind of an operation favors grass production, as there is no grazing during the growing and seeding period of the summer grasses. It is fairly common where both livestock growing and wheat farming are practiced on the same ranch. Also, running a conservative cow-calf herd and a fill-in with stocker yearlings is a standard operation in this area.

Steer Gains High on Native Grass Without Supplemental Feed

Burns operates 4285 acres. He

Reprinted by permission from The Cattleman, Fort Worth, Texas

usually runs 600 to 800 yearling cattle for about seven months each year. Because of low rainfall in 1951 (16.3 inches) and 1952 (12.2 inches), however, he put out only 350 head last fall. Rainfall in 1953 was good—28 inches. From a combination of small grain and native range, steer gains averaged about one and one-half pounds per day this year with a feed bill of only $1.35 per head for hay. Burns said the daily gains by the cattle were just as good on native grass as on wheat pasture.

Overall production averaged about 25 pounds per acre for the entire ranch. On the native grass used for the steers, the gains were estimated at 17 pounds per acre. The steers went out at 20 cents per pound which gave a return of over $3.00 per acre from native grass. This return followed the two low-rainfall years.

Native Grass (Feed) on Ground Now For Next Year's Operations

Grass production was determined on the Burns ranch during August 1954. Production of grass from the 16 inches of rainfall this year again emphasizes the value of cover, grass species and plant vigor in growing pounds of feed. Where there was 500 pounds of cover in March there is 600 pounds of forage per acre now. Where the cover was 1500 pounds in March there are 4200 pounds of forage now, and where the cover was over 3000 pounds in March, the forage now is 6800 pounds. These are air-dry forage weights, but included all standing grass, some of which was last year's growth.

Other important features of Burns' operations as a cooperator of the Miller-Brazos Soil Conservation District is spraying mesquite. About two-thirds of the mesquite has been sprayed. Stubble-mulch tillage with sweep type implement is used on cropland, as well as timely use of a one-way plow to kill weedy vegetation. He also has used Austrian winter peas in the cropping system. The wheat yield was 17.5 bushels per acre this year.

Meat For Half A Million People—The livestock that are bruised, or killed every day on the way to market would supply the daily meat needs of half a million people. Careless handling causes the loss of about 100 tons of beef, lamb and pork every day. To prevent this terrific loss, avoid using clubs or canes to drive the animals. Make sure all broken boards and protruding nails are removed from fences, doorways, trucks, and loading chutes. Keep machinery and junk out of feedlots and barnyards and, of course, cattle with their horns still on are a common cause of injuries.

Management of Turkey Breeding Flocks

Good management practices must be followed if satisfactory profits are to be obtained from the commercial breeding flock. . .

Condensed from Turkey World

Stanley J. Marsden

AT present averages, one turkey breeding hen is needed for every 15 marketable birds produced. This leaves considerable room for improvement in breeding operations.

The number of eggs a turkey hen will lay during the breeding season depends upon age, breeding, management, feeding, and climatic conditions. Without artificial lighting, an average young hen in the Northern states should lay 40 eggs to June 1; in the Middle states, she should lay 50 eggs; and in the far South, 60 could be expected.

Old Hens Lay Less

Flock averages of 90 eggs to June 1, in flocks lighted around December 1, are obtained easily with good-laying strains. Hens in their second year of production will lay around 75 percent as many, while third-year hens will drop to 60 percent as many.

In egg weight, hens in their second year of production lay eggs averaging about seven percent heavier than the average for their first season. The third-season average is about 2.1 percent above the second season average.

Turkeys of a good hatching strain, well fed and managed, should, under good incubation conditions, show a hatchability of 70 percent of all eggs set for the season up to June 1. Poor hatching strains will drop as low as 45 percent for the season. If, in addition, feed and management are not good, it may drop to 30 percent for the season. A good hatching strain, poorly fed and managed, may easily produce a season's average of not more than 50 percent.

Incubation problems are pretty well solved by modern incubators, but care of hatching eggs

Reprinted by permission from Turkey World, Mt. Morris, Illinois, September 1964

often is neglected. Setting once a week is good practice. Holding temperature of turkey eggs should be 50 to 55 degrees Fahrenheit. Temperatures below about 45 degrees, if maintained for more than a few hours, are detrimental. Likewise, temperatures of more than 75 degrees are detrimental.

Turning during holding is not necessary unless eggs are to be held more than 10 days. Then one or more daily turnings is advisable.

Eggs should be packed small ends down for shipping. For holding, eggs should be stored on the sides. They should also be turned for best results.

The holding room should register between 60 and 90 percent relative humidity. About 80 percent has been suggested as near the ideal. Gathering is best done four times or more daily to avoid breakage, dirtying, chilling, or overheating.

Young Stock Does Best

Young hens and toms are best for ordinary breeding operations. Birds more than a year old are of practical use only in pedigree breeding operations. Breeding toms of all but small varieties should be 37 to 41 weeks old when mating starts; hens 35 to 39 weeks when mating starts or is expected to start.

If exposed to artificial lighting both toms and hens should be started under lights at 33 to 37 weeks of age. These ages apply to toms at the start of a four-week pre-lighting period which usually is advisable in all except warm, sunny climates. With small-type turkeys, those ages might be lowered by two weeks.

Hens forced into production by the application of light at ages much less than those listed above are immature, and as a result, lay small eggs, have a short breeding season, and never attain proper size for the breed. Average first-season egg weight of large-type young hens of some strains 33 or 34 weeks old when started under lights is 36 ounces per dozen (85 grams each); that of Beltsville Small White hens started under lights at 31 or 32 weeks of age is about 32 ounces per dozen (76 grams each). With this much maturity, egg size at the start of production is but little lower than that of the season's average.

Hens kept on full feed and not lighted for six weeks or so later than this tend to lay eggs larger by about two ounces per dozen for each breed. Beltsville White hens forced into production in an immature state, 24 weeks for instance, will lay eggs averaging considerably smaller, sometimes as small as 24 to 26 ounces per dozen for the season.

Young Hens Lay Small Eggs

Furthermore, immature hens will lay very small eggs for a

while just as chicken hens do. The first eggs of Beltsville White young hens which start laying at 24 weeks of age may average as low as 22 ounces per dozen during the first ten days of production, varying from about 14.8 ounces per dozen (35 grams each) to about 27.5 ounces per dozen (65 grams each).

The use of over-matured young stock, older than indicated above, is uneconomical because of the long non-productive feeding period required before egg production starts. Also, the toms, particularly those of the large, Broad Breasted strains, are inclined to become too heavy and clumsy for best breeding results.

Stock intended for breeding should in general be grown out in the same way as stock intended for marketing. The only change that might be made is to limit the percentage of corn in the diet of prospective breeders. From six months of age to laying, the percentage of corn in the total diet probably should be held to 30 or less. However, there is no evidence to prove that even this has any particular advantage as far as a feeding program is concerned.

Whatever the diet, it probably should not be restricted,—the birds should be fed all they will eat of balanced diets throughout their lives. Confinement-reared turkeys are suitable for breeding provided their feet or legs are not injured.

In general, variations in the methods normally used for rearing turkeys cause no differences in their value as breeders. What does make a difference is the amount of light received.

To obtain normal growth before reproduction occurs, turkeys must be matured under less than about 11 hours of daylight. This occurs naturally in turkeys hatched during spring and summer, but those hatched between about September 15 and March 15 and exposed to full daylight will come into production before they are sufficiently matured to make satisfactory breeders. These out-of-season turkeys should be reared under light restricted to about the amounts provided by nature during the normal growing period.

What now may be described as standard practice with large, Broad Breasted types in mating up the breeding flock is to select a tom for every 10 hens. Then divide the tom flock in two. Use half of the toms (at the rate of 20 hens to one tom) in the breeding flock at one time. Alternate the two groups of males every week. This practice has been extended with excellent results to the small and medium type varieties.

Don't Allow Too Many Toms

Generally speaking, the medi-

um and small types do about as well if they are mated up to the rate of about 13 or 14 to one for the medium, and about 15 or 16 to one for the small varieties. They are kept in the flock throughout the season. Too many toms often lower the fertility due to interference.

In one-male matings of the heavy strains, a practical ratio is 16 to 1; in medium-sized varieties, 18 to 1; and small-type strains, 20 to 1. In these matings, each tom should be observed in his early mating activities. Remove any that are not able to mate successfully without undue effort.

Large matings are practical and efficient. Five-hundred-hen breeder flocks are a popular size and may be the most practical from all angles. One thousand hens likewise makes a good unit, while matings as large as 2,000 are successful.

The tendency for toms to fight and interfere with each other seems to be an individual matter. Some breeders purposely eliminate over-aggressive toms on the theory that more cooperation and less interference will thus result. Plenty of feeders and an ample range area may help.

Pre-Light All Toms

Recent experimental work at Beltsville has indicated that, contrary to previous suggestions, it is advisable to pre-light the toms even of flocks that are not being artificially lighted. This is relatively cheap and easy to do, but it should not be overdone.

According to the Washington Experiment Station (Pullman), it may be advisable to preheat the toms, but the heat, at about 50 degrees F., should be accompanied by artificial lighting. In moderate climates, such as that of the border and Southern states, there probably is no need for preheating, but pre-lighting appears to be a sensible precaution to take under most conditions.

Saddling the hens is almost universally practiced with large strains and is becoming popular with the other varieties. However, it is not necessary with other types, provided the toenails of the males are examined and the sharp ones trimmed to, but not into, the "quick." They should then be rounded off with a file. About the middle of the season, they should be examined and clipped again when necessary.

Saddles should be chosen with care to obtain a type and size that will neither slip nor bind, and which will not choke the hen if she gets her head into the wing-hole. Saddles with solid wingholes are likely to cause some mortality. Those with cross-straps and those with expansible wing-holes are less like-

ly to cause trouble. Cloth used should be reasonably heavy and have longitudinal ridges sewed into, or onto, it to give the tom a toehold. If saddles are to be marked, white cloth should be used.

Marking the saddles for easy identification during trapnesting is widely practiced.

Clipping of the flight feathers of one wing of hens usually is practiced to keep them in their quarters and reduce damage. Wings of males should not be clipped after the age of about 16 weeks as it tends to unbalance the tom during mating.

Separation of breeding flocks from each other is almost universally practiced to prevent interference in mating. Either a fence, solid for three feet up from the ground, or an empty yard 10 feet wide or wider should be used. Six-foot fencing is very desirable to confine breeding birds, especially pedigree matings. Two yards for each breeding unit are desirable to allow for better use of the green feed and to separate the matings by an empty yard. In large flocks, this also aids in the control of broodiness by placing broody hens in the empty yard with feed, water, and roosts, but no available nests.

Placing extra toms with the broody hens for four or five days aids in breaking the hens of setting. Prompt checking and moving of broody hens is necessary to avoid undue loss of the hens' time.

Frequent moving of the breeding units to clean ground is not widely practiced, but it may be necessary in some instances, to control diseases and parasites.

As a rule, a clean location is used each season. If stationary equipment is used, double yards should be provided. They should be allowed to remain vacant at least five months out of the year.

As for young stock, good natural drainage is highly important. Turkeys of any age never should be located on poorly drained land.

In flock matings, the amount of range provided should be sufficient to supply plenty of green feed and will vary according to weather, soil, and range crop used. Good bluegrass range will support around 300 breeders to the acre under continuous use during the normal spring breeding season. In one-male trapnested matings of 13 to 21 birds, where double yards are provided to be alternated at intervals of four weeks, a good size for each yard is 14 to 16 feet wide, and long enough to provide about 80 square feet per bird.

How to Organize a Land Judging Contest

Land Judging Contests have proved of great value. Here are the details of organization . . .

Condensed from
What's New in Crops and Soils

Edd Roberts and *Harley A. Daniels*

LAND judging is a new tool developed to teach young farm people the fundamentals of proper land use.

The idea originated at the Red Plains Conservation Experiment Station, Guthrie, Okla., in 1941. Gradually new ideas were pieced together and a tentative score card prepared.

Land use practices and conditions are different in each soil and farming area of Oklahoma. As a result, the Oklahoma score card was revised no less than 27 times. During this process, we learned to judge land in much the same manner as that of judging livestock.

In organizing a statewide land judging contest, the State Extension Soil Conservationist is the logical person to promote and develop the program. Preparatory work consists of selection of sponsors, setting the date, and properly publicizing the event. Local contests can be arranged by county agents, vo-ag teachers, 4-H club leaders, and others.

Immediately before the contest, the judging committee is selected. It is composed of a soil scientist and representatives of the local agricultural agencies. This committee secretly selects the site, locates the fields, and makes the placings, using land capability guides. The fields may be selected on any farm or experiment station which is accessible to a good road.

Four fields are generally used in each contest. They are usually numbered 1, 2, 3, and 4. Pits are dug in each field so that the contestants can examine the soil. If more than 100 persons are

Reprinted by permission from Crops & Soils, Madison, Wisconsin

expected, additional pits must be dug. Designate these "A," "B," etc. A generous sample of both surface and subsoil is placed near the pit for closer observation.

Personnel consists of a contest chairman, a supervisor in charge of each field, and a guide for each pit in the field. The chairman announces the rules and gives instructions. The supervisors are well trained technicians who give pertinent information to each group that visits their particular field.

Each guide escorts his group of contestants from one field to the next. For example, a group starting at pit A in Field 2 would move next to pit A in Field 3, then pit A in Field 4, and finally, pit A in Field 1. Another group starting at pit B in Field 2 would visit all four fields in the same manner.

Groups are usually limited to 25 or 30 contestants. However, any number of contestants can be accommodated simply by adding more pits in each field and providing enough guides to take care of them.

The contest is open to competing individuals and teams. Each team consists of four individuals. The three high-scoring individuals constitute the team proper, and the low scorer becomes the alternate.

The contestants are given land judging score cards for each field. The cards are numbered for teams 1, 2, 3, etc.

Individual members of the first team are designated as 1A, 1B, 1C, and 1D. Teams 2, 3, etc., are assigned likewise. For example, contestant 1A will start at Field 1, 1B at Field 2, 1C at Field 3, and 1D at Field 4. This arrangement makes it easier to handle and tabulate results.

In general, Part 1 of the score card is based on six easily identified soil factors. Part 2 is based on the selection of proper land use practices of vegetative cover, mechanical treatments, and fertilizer and soil amendments necessary for the different land classes.

The original surface soil depth and other soil conditions are given each contestant as he visits the field, and he is told whether it is cultivated land or land formerly in cultivation. He then decides, from his own observations, whether the soil is deep, moderately deep, shallow, or very shallow. By feeling the soil in his hands, he determines whether the texture is coarse, medium, or fine.

The movement of the air and water in the subsoil, or soil permeability, is determined in handling the soil and by observing whether it is crumbly, dense, loose or tight. Each person then

classifies the soil under the headings rapid, moderate, slow, or very slow.

Next he observes the topography of the land in the field and decides whether it is nearly level, gently sloping, moderately sloping, steep, or very steep.

The top soil is then examined to see how much remains. From this, the contestant can determine the amount of soil removed by wind and/or water and can classify the erosion damage as very severe, severe, moderate, or none to slight.

The last factor considered is soil drainage—whether it is poor, fair, good, or excessive.

When all of these factors have been rated, the contestant decides in which land capability class the field belongs. After he classifies the field, the contestant decides which land use practices are needed for proper treatment.

The score card lists a large number of practices which can be used. Some will apply to the fields the contestant is judging; others will not. Each possible treatment is numbered on the card, so he merely selects the proper number and places it on a square under Part 2 of the card. A sign showing the results of a previous soil test is set up in each field, so that the contestant can determine lime and mineral fertilizer requirements.

When the contestants complete the judging of a particular field, their cards are collected by the guide and given to an individual who takes the cards to the headquarters office. Their work is then graded according to the official placings of the judging committee, and the scores tabulated by a grading committee of 6 to 8 persons per 100 contestants. This committee is usually composed of the coaches of individuals and teams and the members of local agricultural agencies.

A perfect score is 60 points for each field, 240 for the contest. Winning individuals or teams are those which earn the highest number of points. For an added incentive, prizes may be awarded the winners.

Control of Internal Sheep Parasites—Twelve years of testing by the U.S. Department of Agriculture has proven that phenothiazine mixed with salt and fed continuously on a free-choice basis is both safe and effective in controlling internal parasites (worms) in sheep on pasture. In larger doses the same chemical is effective for cleansing sheep and other livestock already heavily infested with internal parasites.

How Much More From Irrigation?

Experiments in various sections prove the worth of irrigation . . .

Condensed from Successful Farming

HOW profitable will irrigation be east of the Missouri River and north of the Mason Dixon's line? We're starting to get some experiment-station figures.

In these tests, yield increases are accurately checked against the costs of irrigating. Here are some of the first conclusions available.

Summed up, the results are *favorable for irrigation on lighter soils—less conclusive on heavier soils.* Pasture and hay crops respond more consistently than other field crops.

At the Dixon Springs, Illinois, Experimental Station, they have irrigated Ladino-clover-mixed-grass pasture since 1948. They found that the greatest yield increases from extra water came where fertility was highest. Irrigation increased forage yields 50 to 100 per cent, depending on the year. *This meant they could carry from ½ to 1 cow more per acre on these pastures.* Animal gains ranged from 50 to 140 pounds more per acre annually, depending on the natural rainfall.

In New York, they've found irrigation profitable only on lighter soils. For instance, H. A. Kerr, soil conservationist at Cornell, had one location on fine sandy loam where irrigation increased alfalfa-brome yields one ton per acre (dry-weight basis). On another field with heavier soil and more adequate rainfall, there was no significant response in yield to irrigation.

Cornell agricultural engineers have calculated that it costs about $15 per irrigated acre annually to pay for and keep up equipment. They found operating costs to be $2.40 per application with an average of six applications annually. This brings total costs to around $29 per acre.

In Indiana, Purdue Agronomists G. G. Williams and D. L. McCune have completed 3 years of tests of irrigation on legume-grass pastures. They found the following advantages, particularly on lighter soils:

(1) With irrigation, you can stock to the maximum all season.

Reprinted by permission from Successful Farming, Des Moines, Iowa

(2) You don't have to grow emergency pastures like sudan grass, making the land available for other crops.

(3) You can be sure of 3 good cuttings of alfalfa—4 in the southern Cornbelt.

(4) You can prepare a seedbed in midsummer and be sure of a good stand.

(5) Irrigation maintains legumes in a pasture.

Williams adds that before irrigating, be sure you've gone as far as you can in improving your pasture by fertilizing and reseeding. To irrigate, you'll need a water source that can supply 27,000 gallons for each inch of water you'll apply per acre. Williams and McCune have applied 3 to 10 inches annually in their tests.

In central Missouri, D. M. Whitt of the Agricultural Research Service and the University of Missouri has been irrigating corn in tests since 1948. The soil is medium on the surface with a tight subsoil. High fertility and stalk populations are maintained.

Whitt applied an average of 3.5 inches of water each year. The average unirrigated corn yields in a rotation for the 6 years was 85 bushels. On irrigated land, the yield was 110 bushels. His continuous corn plots averaged about the same. In the 1953 drouth, a single irrigation of 2 inches in late July increased yields 16 and 28 bushels per acre on two plots.

Orange Tag Helps Sort Brucellosis Vaccinates

Orange, numbered ear tags have become a trade-mark of "ready to go" brucellosis-vaccinated beef heifers in the Southwestern Region. Since this identification can be seen readily, it speeds up the handling of such animals and helps to save an estimated $100 a load in veterinary fees, shrinkage, and extra feed. It requires at least three days to test heifers for interstate shipment, if they have not been identified as officially-vaccinated in some way.

This original move, offered as a service to cattle growers in the Southwestern Region, will capitalize on the federal government's program of brucellosis eradication. The orange tags are being accepted by both state and federal officials for interstate shipments of heifers, when accompanied by a vaccination certificate by accredited veterinarian.

Such a system was successfully used some thirty years ago in identifying tuberculosis-free cattle in transit.

Roy L. Cuff

Does a Break in Growth Hurt Beef Cattle?

Not as long as maintenance rations contain adequate protein, carotene and minerals . . .

Condensed from Agricultural Research

IT'S OFTEN SAID that you have to keep beef calves growing continuously if you want them to gain well.

The matter's important to cattlemen because the growth of calves is slowed down when they have to be carried for several months on sparse winter forage or drought-stricken range. The majority of our beef animals probably are raised under such a system.

But animal physiologists now say the idea that you have to "keep 'em growing" isn't necessarily true.

In experiments at the Agricultural Research Center, Beltsville, Md., C. F. Winchester and associates interrupted the growth of beef calves for as long as six months with no apparent ill effects. Though their rations had been short on energy-giving carbohydrates, the calves still made good feeders if they had received enough protein, carotene, and minerals to maintain health and vigor.

The physiologists recognized, of course, that poor nutrition due to adverse range conditions usually involves a reduction in the quality of feed. These scientists believed that any loss of ability to use feed efficiently after their growth has been retarded may largely develop from lack of nutrients *other* than carbohydrates in the range forage.

To test this theory, the scientists used several sets of identical twin calves. Such twins, coming from the same egg and thus having common inherited characteristics, usually react in much the same way. This made it possible to draw conclusions in a relatively short period of intensive research covering the last

Reprinted from Agricultural Research, U. S. Dept. of Agriculture, Washington, D. C.

four years.

One member of each set of twins was used as a control. This animal was fed a recognized liberal-allowance ration. The other twin of each pair became the experimental animal. Such twins were fed varying percentages of the full ration at varying ages and for varying periods.

The researchers discovered that the experimental calves—even those carried to a maintenance level—gained thriftily when they were later put on full feed. It didn't appear that the restricted ration and retarded growth had caused any loss of efficiency in feed utilization.

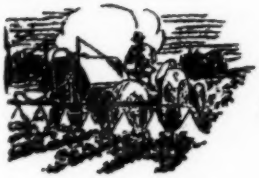
Calves carried on a ration containing only 50 per cent of the liberal calorie allowance from the age of 6 months to 13 months neither gained nor lost weight appreciably during that period. When put on a liberal allowance, they gained just as well as the control animals—even better in some cases. The controls were slaughtered at slightly over 1,000 pounds at 16 to 22½ months of age. The experimental animals were slaughtered at the same weight at 20 to 22½ months.

Although the 50-per cent ration had an energy content of only about maintenance level, the protein, carotene, and mineral content was adequate for rapid gains. So the calves, when put back on a full ration, were healthy and capable of resuming normal growth. This indicated clearly that their slowdown in growth resulted primarily from the low energy value of the ration.

At slaughtering time, the scientists found no appreciable difference in carcass grade or meat quality that could be charged to the interruption in growth. They found the cost of producing a pound of beef only slightly increased. They found, in fact, greater gains per unit of feed intake by the experimental animals during much of the period following limited feeding.

The scientists say that feeding for rapid, continuous gain in order to market beef at the earliest possible age is still the more profitable plan when feed prices are low enough. But they believe their work has proved that when feed prices are temporarily high, cattlemen may well carry young animals as long as 6 months on a maintenance ration that meets all the nutritional needs other than energy requirements for growth. Such a ration must contain *sufficient* protein, carotene, and minerals.

In the year 52 A.D. Seneda said, "Most men do not care how nobly they live, but only how long, although it is within the reach of every man to live nobly, but within no man's power to live long".



New Weed Killers and How to Apply Them

Latest research brings us new materials and new methods of application . . .

Condensed from New Jersey Farm and Garden

Dr. E. M. Rahn, University of Delaware

WEEDS where they shouldn't be! It happened last year after using new chemical weed killers.

It looks as if we'll have to rub some of the blame off on the weatherman (not the chemical men)! Here are explanations for some of the failures so you'll know what to look for this year. Then we'll suggest new weed killers to try.

Most failures occurred when there was little or no rainfall for two or more weeks following pre-emergence applications. For example: In some cases Karmex W (formerly CMU) failed to control weeds at "lay-by" in asparagus; Alanap-1 failed in cucumbers, cantaloupes and watermelons; and Premerge Sinox PE, or Santobrite failed to control weeds in snap and lima beans.

Irrigation within a few days of application would help weed killers do their job. These pre-emergence herbicides need water to dissolve and disperse them so they can kill germinating weed seeds. If irrigation is not available, growers will have to accept this lack of control under drought conditions as part of the gamble involved.

While weeds theoretically are not supposed to germinate under drought conditions, there are always a few, such as morning glory and barnyard grass, that defy dry weather and germinate anyway.

Wrong materials accounted for poor weed control, too, especially on lima beans. In Delaware, Premerge and Sinox PE are not recommended for limas grown on sandy or lighter soils. Santobrite will do a good job without causing crop injury and under a wider range of climatic conditions than any material so far tested.

Reprinted by permission from New Jersey Farm and Garden, Sea Isle City, N. J.

Edgar F. Isaacs and Sons, growers at Lincoln, Del., have used Santobrite with good results under varying weather conditions for two years on 200 acres of limas. "When an extended drought follows planting, though," says Penn Isaacs, "weed control has been only fair." While Santobrite has a disagreeable odor, no injury to workmen will occur if it is carefully used.

Another cause of poor weed control last year was improper application. For example: Lack of sufficient agitation in the tank and/or using a boom of too great diameter produced strips of poor weed control in asparagus fields. Diameter of the boom should not be larger than a half inch, or the flow of the suspension at the boom ends is so slow Karmex W and other wettable powders or emulsions will settle out. The tank should have a mechanical agitator if you're using the latter. Hydraulic agitation is not usually sufficient.

Let's take a look at some new herbicides suggested for use this year.

We're suggesting chemical weed control in tomatoes at "lay-by" for the first time. Recommended chemical is Natrin (sodium 2,4,5-trichlorophenoxyethyl sulfate). It should be applied to a small area *on a trial basis* at first. For better results, apply Natrin after the tomatoes are about half grown and are cleaned for the last time by cultivation and hoeing. It will not kill weeds already above ground. Furthermore, the spray should be directed to only the lower one-third or half of the plants.

For Asparagus Seedlings

Another first-time recommendation is post-emergence application of Karmex W on asparagus seedlings, also on a trial basis. It should be applied after seedlings are about four inches tall and have been cleaned by cultivation and hoeing. Experiments indicate that over-all sprays containing 1 to 1½ pounds of Karmex W per acre are safe for asparagus seedlings. Number and weight of crowns dug last November were not reduced.

Will Karmex W accumulate in the soil to toxic levels when used over a period of years? We don't think so. After four years of experimenting in Delaware there is no evidence of injury to asparagus yields or growth where much more than the recommended rates have been applied each year.

Last spring we took soil samples at 0-4 and 4-8-inch levels from plots where Karmex W had been applied for three or four years. Chemical analysis of these soils indicated that about one-quarter of the previous year's *ap*plication still remained in the top

four inches of soil. No Karmex W was found in the 4-8-inch layer where recommended rates had been used.

Rates for Karmex W

Still not satisfied, we made tests in the greenhouse where oats —a plant especially sensitive to Karmex W—had been grown. There was no evidence of toxicity where two and four-pound annual rates were used. Where an eight-pound annual rate was used there was some toxicity. So to avoid future trouble, best advice is to apply only the recommended rates.

Karmex W might eliminate a discing at the end of the asparagus cutting season. It will take two or three years of experimenting to be sure, but work to date shows that when asparagus is not disced at that time it has a head-start on that which is disced —probably about a week to 10 days of growth.

Johnson grass is always a problem, especially in lima bean and asparagus fields in Delaware. Tests indicate that foliage sprays of Dalapon—a new Dow Chemical Co. product—are quite effective for killing this vicious weed—much more so than TCA sprays.

Some farmers have asked if using a rotary hoe will affect lima bean yields if weeds are not a factor. Evidently it will. Here's what happened at the Isaacs' farm last season:

Hugh Martin, an employee, rotary-hoed a portion of one lima bean field where Santobrite had given perfect weed control. Seeding rate was 50 pounds per acre and the beans were at the two-leaf stage when rotary-hoed. Result was a 7½% reduction in stand, an 11½% reduction in yield..

While this was a single test in only one year, it indicates that higher yields can be expected if weeds can be controlled during the first part of the growing season with chemicals alone rather than by rotary hoeing.

There are other effective herbicides growers can use, but instructions must be followed for good results. Some others include:

Sweet Corn: Pre- and post-emergence, 2,4-D; pre-emergence, Dowicide G and granular cyanamid. *Beets*: TCA, for grasses. *Carrots*: Stoddard Solvent. *Peas*: Dinitros (water soluble), and cyanamid dust. *Asparagus*: Crag Herbicide-1 and Sesin; for seed beds, Geigy PCP No. 10 and Crag Herbicide-1, post-emergen. *Lima Beans*: Dowicide G and Pre-merge, applied right after seeding.

Vine Crops (cantaloupes, cucumbers, watermelons, pumpkins, squash): Alanap-1, right after seeding. Contract herbicides—

Geigy PCP No. 10, Dow Selective, Sulfasan. *Cole crops, lettuce*: (for trial) Chloro IPC, after seeding or transplanting. *Strawberries*: Summer weeds, Crag Herbicide-1 and Sesin. Winter weeds (chiefly chickweed), Dow Selective.

Wide Row Corn May Bring Big Changes

"Seeding alfalfa and other hay crops in wide row corn makes it very possible that during the next ten years we may see one of the greatest changes in our rotational system. The prospect of growing corn and still preventing soil erosion is practical with the wide row corn method. Establishing alfalfa in corn will make it possible to keep our soil protected a greater share of the time," says A. E. Peterson, University of Wisconsin.

"Farmers will also produce feed more efficiently. The oats of our present rotation has usually produced 1,750 pounds of T.D.N. per acre (75 bu. of oats). Whereas, corn (100 bu.) will produce 5,250 pounds of T.D.N. and alfalfa hay (4 tons) will produce 4,000 pounds of T.D.N. Thus, going directly from corn to alfalfa wil help to produce feed more efficiently in our dairy rotation," Peterson says.

Interseeding legumes in corn is not a new idea. However, only in recent years have the corn rows been spaced so enough sunlight can reach legume seedlings, and sufficient amounts of plant food applied not only to feed the corn but also the alfalfa seedings. Here are some of the problems that must be solved when using wide row corn:

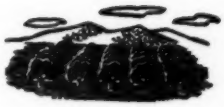
1. Planting the corn in wide rows
2. Use of corn varieties that are suited to crowding
3. Cultivation and chemical weed control
4. Proper method of seeding desired legumes
5. Wheel track planting
6. Prevent hilling of corn rows
7. Sufficient moisture supply

"The advantages are:

1. Conserves the soil
2. Increases feed production per acre per rotation
3. Eventually requires less machinery
4. Since plowed land is seeded the same year, some weeds are not allowed to go to seed

University of Wisconsin

Mulches for Fruit Trees



Keep your fruit trees healthy and productive, advises this veteran fruit grower . . .

Condensed from American Fruit Grower

E. Stuart Hubbard

IN considering the use of mulches for fruit trees an understanding of the basic conditions under which the trees have evolved and survived in nature to maintain their finest growth is essential.

Our fruits thrive on soils which support our finest hardwood forests. These finest forest trees grow under a natural mulch system. Each year's growth of leaves as well as dying twigs, roots, and the excrement and remains of microbe and animal are returned to the soil. By fall, such material has been almost entirely taken into the soil by worms and other types of plant food manufacturers.

Each year this uniform supply is provided and conditioned for use by the tree. Only abnormal climate or mechanical changes or insect pests and diseases upset the perfection of health and growth of such trees. Never is there a deep layer of old rotting vegetation; never a mass of high nitrogen animal or vegetable material available to the roots. The minerals in the soil with nitrogen from the air complete the supplies of plant food.

Under nature's shaded conditions insoak of rain and aeration of the soil are ideal; surface evaporation is low; the soil surface is moist except in severe drought.

It becomes evident to the horticulturist that the more closely he can approximate these natural conditions in his orchards the better the growth and health of his trees should be. His experience demonstrates that fruits so grown have higher color, longer keeping quality, bruise and drop less, and have the finest flavor and texture.

Mulch materials high in leach-

Reprinted by permission from American Fruit Grower, Willoughby, Ohio

able nitrogen can supply quickly available plant food after soaking rains. Material low in solubles may not only contribute no immediately available plant food, but may instead take from the soil's meager supply of nitrogen, for use by organisms which at once start to break down the raw organic materials. Then after several years, unless available nitrogen is supplied for the tree or the food manufacturers in the mulch, the decayed mass may oversupply the tree with available plant food, causing overstimulation.

Some of the oldest apple trees with a history of producing the largest crops of the highest quality, best-flavored fruit grow on soils having a high water table in the spring. Fruit tree roots in such soils are: 1) horizontal and 2) vertical. The horizontal roots extend a short distance below the surface. It is through their fine feeding rootlets that nutrients are largely absorbed and that air is obtained.

A moderate application of rich mulch each year maintains, in the better orchards, a mat of broken-down organic materials above the highest water level where rootlets from the horizontal roots can always find air and prepared plant food in ideal form. When drought occurs, vertical roots grow down from the lowering table to supply the leaf surface with water. It has been demonstrated that, unless the rootlets of the horizontal roots can continue to function, the quality of the fruit declines.

It is evident that a proper mulch mat maintains a moist condition, exceut in very severe drought, bu absorption of moisture from the air, by channelling the water from showers to the rootlets and by causing granulation of the close-grained subsoil, thus permitting the passing of water upward.

These wet soils are considered to be unsuitable for fruit. They have been unsatisfactory under clean culture or fertilized sod.

Most horticulturists have observed the beneficial effects of mulches on light soils. Their effect on deep, natural orchard soils is often striking in the improvement of the quality and the flavor of the fruit, provided the mulches have been correctly used.

The correct use of mulches in orchards and groves can be better comprehended if it is understood that organic, chemical, biological, and mechanical factors must contribute, in correct balance, in the manufacture of plant food and in providing soil and moisture conditions most favorable to the production of heavy crops of fruit of the finest type and most durable, long keeping quality.

PROTECTING YOUR LIVESTOCK AGAINST MINERAL DEFICIENCIES

Recent research has increased our knowledge of the needs for trace elements. . .

Condensed from Holstein-Friesian World

METHODS whereby farmers can protect cattle and other livestock against mineral deficiencies have been reported by Dr. Gustav Bohstedt of the University of Wisconsin.

In a report to the Salt Institute, he said the cost of necessary minerals added in trace or minute quantities to salt "is relatively cheap insurance against the various known mineral deficiencies in our farm animals."

Dr. Bohstedt said cobalt, iodine, manganese, copper and iron are the most essential trace minerals needed to correct known deficiencies. Zinc, which is available from several feeding sources, is sometimes added in certain trace mineral salt formulae as an extra precaution.

Salt is considered the most essential of all minerals to feed because it is required daily, and as such was termed "the logical carrier" for trace minerals as the sodium and chlorine of salt and trace minerals are related in the work they do. The elements of trace mineralized salt function better as a group than alone. Trace mineral salt should be fed free choice daily throughout the year to insure minimum necessary levels at all times.

Animals by instinct eat just so much salt and no more. This "limiting factor" of salt prevents an animal from over indulging and is added assurance that these minerals will not be consumed in excessive amounts at any one feeding.

"For a complete mineral feeding program," Dr. Bohstedt said, "farm animals should be fed trace mineral salt and a simple calcium-phosphorus mineral mixture on a free choice basis. This simple mineral feeding program should be coupled with a sound grain or concentrate feed, and with a pasture or roughage program to fit the need, topped with free access to fresh water."

The results he said, will be more thrifty animals, improved

Reprinted by permission from Holstein-Friesian World, Laconia, N. Y., December 4, 1954

weight gains, and healthier animals.

Dr. Bohstedt calculated the annual trace mineral cost per farm of between $6 and $10 on the basis that the average farmer or dairyman buys little more than a half-ton of salt per year, and that the cost of the added minerals becomes a minor matter of consideration.

For example, if an average producing dairy cow consumes 20 pounds of salt per year in addition to the salt added to its feed ration, the additional cost for trace mineral insurance will be less than one cent per pound.

Defining the basic areas of mineral deficiencies, Dr. Bohstedt included: Great Lakes region and some northwest states lacking in iodine: several regions including Florida and some northeastern states and parts of Michigan and Wisconsin lacking in cobalt; the sand or sand-derived swamps of Florida, lacking copper and iron; and many livestock rations, especially poultry rations in various regions lacking manganese.

Chickens, he pointed out, have an unusually heavy demand for manganese for purposes of early growth, for reproduction including the hatchability of eggs, and for proper bone growth and avoidance of perosis or slipped tendon. In the case of poultry, of course, trace mineral salt is not fed free choice, but the minerals are introduced through prepared feeds.

"It seems obvious," his report stated, "that if an iodine or a cobalt deficiency is found in one or the other section of the country, that iodized or cobaltized rations should be used by way of nutritional protection. Adding these minerals to salt has given protection against deficiency in cattle, sheep or other ruminants.

"This still leaves unanswered the question of whether such fortified salt should be used everywhere. I mentioned the factor of insurance. It is readily understood that the purchase of insurance may be widespread if the rates of the premiums are low. In the case of trace minerals, whether conveyed to the feed by special pre-mixes or by trace mineralized salt, the rates are or can indeed be quite low."

North Dakota Agricultural College, in its own studies, stated that "all farm livestock need salt. Without it livestock cannot make full use of protein supplements. Keep it always available, in loose form."

The Experiment Station added these specific recommendations:

Beef cattle—feed trace mineral salt, loose and free choice. Salt blocks may be used in the pasture to control grazing and in addition to loose salt.

Dairy cattle—feed trace min-

eral salt free choice. In addition, mix one pound of loose trace mineral salt with each 100 pounds of grain mix.

Sheep—feed trace mineral salt to the breeding flock, loose and free choice.

Swine—feed loose trace mineral salt to hogs as it contains necessary iodine, iron, copper, cobalt and manganese. Be sure the salt is fresh, not stored over long periods of time. (Stabilized salt to maintain trace mineral content is available to meet extended storage and pasture exposure conditions.)

Couple these recommendations with the free choice feeding of calcium and phosphorus, from such sources as crushed limestone defluorinated rock phosphate, dicalcium phosphate, monocalcium phosphate and bonemeal, for a balanced mineral feeding program.

The Salt Institute, through its agricultural research, points out that some 17 essential elements including 13 minerals are needed by farm animals.

1. Oxygen — needed for the oxidation of nutrients and energy.
2. Hydrogen — a part of all important body fluids.
3. Nitrogen — the foundation of all tissues, particularly of proteins.
4. Carbon — the basis of the carbohydrates needed for energy.
5. Calcium — for sound teeth, sturdy bones and certain enzymes.
6. Phosphorus — essential to all cells, various enzymes, works with calcium in bone formation.
7. Potassium — important to nerves, muscles, growth and important enzyme groups.
8. Magnesium — for normal structure of growing tissues, certain enzymes.
9. Sulphur — for certain amino acids, insulin, various enzymes.
10. Chlorine — (from salt) for hydrochloric acid need to protein digestion.
11. Sodium — (from salt) maintains fluid balance of the body, stimulates heart muscle.
12. Iron — for red blood corpuscles, important to certain enzymes.
13. Copper — helps iron in blood formation, activates certain enzymes, needed for reproduction.
14. Cobalt — for healthy intestine, vitamin B^{12} and bone marrow.
15. Manganese — needed for reproduction, milk flow, healthy intestines and bone growth.
16. Iodine — for thyroid gland which controls all bodily activities.
17. Zinc — plays an important role in the digestion of car-

bohydrates.

To be scientifically correct, the mineral compounds which are added to salt to provide those trace elements which may be lacking in natural feedstuffs include, among others, manganese phosphate, manganese sulphate, manganous oxide, iron phosphate, iron oxide, copper carbonate, cobalt carbonate, thymol or potassium iodide, and in certain instances zinc carbonate, where zinc is desired.

To overcome the tendency of iodine to react with the metallic trace elements, salt producers have developed various compounds and manufacturing techniques which have resulted in trace mineral salt mixtures which are stable as to iodine over long periods of storage.

Origin of these trace mineral additives stem from iodized salt for human consumption, a factor that has in large measure reduced the incidence of goiter among humans.

Trace mineral salt derived its name from the minute quantities added per 100-pounds of salt, the process being controlled through elaborate scientific measuring and quality control equipment.

Use of trace mineral salts is growing rapidly as dairymen, stockmen and poultry producers turn to a year-round trace mineral feeding program. During the past year it is estimated that 125,000 tons of salt with added minerals were consumed.

In addition to the free choice method of feeding trace mineral salt, with calcium and phosphorus provided separately in a simple mixture, the Institute said there are two other basic methods of incorporating trace minerals and salt into the animal diet.

One is the use of trace mineral salt in the preparation of complete mineral mixtures, or mineral supplements. These mixtures are sold containing from 5 to 40% salt, ground limestone for calcium requirements, varying percentages of phosphorus sources, the trace minerals and various appetizers.

The second method is via trace mineral salt incorporated in the manufacture of formula feeds, or in the custom mixing of grains and concentrates. Trace mineral salt is one of the most economical and convenient methods of fortifying formula and custom mixed rations, because it is added in sufficient bulk (5 to 50 pounds per ton of feed) to be distributed uniformly within the usual feed mixing cycle.

The question is not if you "can take it with you", but if you can hold on to it until you go.

Feeding the Brood Sow

The feeding and care of the brood sow is a subject of important concern to every farmer who who raises hogs . . .

Condensed from American Hampshire Herdsman

Leland F. Tribble, Dept. of Animal Husbandry
University of Missouri

THE feeding and management of the bred sow affects the number, strength and weight of pigs farrowed. It also affects the number and weight of the pigs at weaning. Thus, the proper feeding and management of the bred sow may mean the difference between the success or failure of a swine enterprise.

One of the most important factors affecting litter size is prenatal deaths. Experiments have shown that the majority of these losses occur during the first 30 days of the gestation period, as one of the most critical times in the gestation period is when the fertilized egg is being implanted. This emphasizes the importance of starting your feeding and management program at the time the sow is bred.

Over two-thirds of the growth of the baby pig is made during the last four weeks of the gestation period, a fact which indicates the need for increasing the daily feed supply as pregnancy advances. However, one should avoid heavy feeding during the last few weeks as well as underfeeding during the first few weeks after breeding. Heavy feeding during the last few weeks of pregnancy is one of the main causes of flushed, overstocked udders at farrowing.

The sow should gain between 75 and 100 pounds during the gestation period or at the rate of three-fourths to one pound per head per day. The sow will lose around 45 pounds in pigs, placental membranes and fluids at farrowing, and the remaining gain is a reserve for the lactation period. The desired gain can be obtained by feeding gilts one and three-fourths to two pounds

Reprinted by permission from the American Hampshire Herdsman, Peoria, Illinois, February, 1955

of feed per 100 pounds of live weight per day or by feeding sows one to one and one-fourth pounds of feed per 100 pounds of live weight per day. This should be increased or decreased, depending on the condition of the sow. The sow should not be allowed to get too fat, since excessive fatness is one of the main causes of pigs born dead or so weak that they are easily overlaid.

There is much more to feeding a bred sow than obtaining the desired amount of gain during the gestation period. The gains can be obtained by feeding corn or other grains alone, but the results may be disastrous. Feeds containing adequate amounts of protein, minerals, and vitamins should be used to supplement the grains. The rations should contain about 15 per cent of good quality crude protein for gilts and slightly less for older sows. Milk products are probably the best supplements to grain, but are usually too expensive to use except in limited amounts. Tankage and soybean oil meal are more practical supplements to grains for the bred sow; however, other protein supplements may be used.

Minerals, especially calcium, phosphorus and salt, are needed in addition to grains and protein supplements. The value of trace minerals is of questionable importance in some areas, while other areas are known to be deficient, especially in iodine. Under most conditions, a mineral mixture of equal parts ground limestone, steamed bone meal, and salt, with iodized salt being used in the iodine deficient areas, will supply adequate minerals when fed free choice to the sows. A trace mineralized mixture may be fed as insurance against possible trace mineral deficiencies.

Vitamins are a very important portion of the diet of the bred sow. Good pasture will furnish most of the necessary vitamins, and should be the basis for any program of feeding and managing the bred sow. Good growing grass and legumes are an excellent source of carotene and most of the B-complex vitamins, except possibly B^{12}. A smaller amount of protein supplement is required when sows are on good pasture as it contains considerable good quality protein. Sows can maintain themselves or even gain weight on good quality pasture during the gestation period. However, it is best not to depend on pasture alone as the complete ration for the sow, but to use it to reduce the amount of concentrates required. If pasture is not available, good legume-hay may be fed to the sows as a source of carotene and most of the B-complex vitamins. Fifteen per cent dehydrated alfalfa meal in the ration is an excellent vitamin

supplement. Cod liver oil is a good vitamin A supplement, or other vitamin A concentrates may be used. The sows should obtain plenty of vitamin D from the exposure to sunlight. B-complex vitamins may be supplied in crystalline form or in vitamin concentrates if pasture or good legume hay is not available.

Examples of some rations for bred sows are as follows:

	Protein supplements for sows on good pasture	
1)	Soybean oil meal	50 lbs.
	Meat scraps or tankage	50 lbs.
2)	Soybean oil meal	50 lbs.
	Wheat shorts or middlings	25 lbs.
	Meat scraps or tankage	25 lbs.

The proportions of the ingredients in these supplements may be varied, depending on relative prices.

If good pasture is not available, dehydrated alfalfa meal or ground legume hay should be added at the rate of 25 per cent of the protein supplement. Three-fourths to one pound of the above supplement together with four to five pounds of grains should provide a balanced ration for the bred sow.

The value of antibiotics in the ration of the bred sow has not been established, but the results of most research show that they are of little or no value to the bred sow.

Probably the most satisfactory method of feeding bred sows is to hand feed twice daily, giving one-half of the daily allowance at each feeding. However, the sows may be self-fed if the bulk in the ration is high enough to prevent them from becoming too fat. The bulkiness of the ration may be increased as desired by including a larger proportion of such feeds as oats, dehydrated alfalfa meal, or ground legume hay. Regardless of the method of feeding, adequate trough or feeder space should be provided so that animals have a chance to get at the feed. Generally, sows differing widely in age and weight should be fed separately.

The importance of supplying plenty of good, clean water is often overlooked. A sow will suffer more quickly from a lack of water than from the lack of any other food nutrient.

Housing need not be elaborate, but should provide a dry and draft free place for the sow to sleep. The house should not be allowed to become dusty. Plenty of shade should also be provided during the summer.

Agricultural research continues to claim a larger share of taxpayers' dollars. The last federal appropriation was increased about $10 million over the previous year according to the U. S. Department of Agriculture.

A Bank's Farm Program

This interesting program was hatched on a nail keg, and rescued a town's declining economy . . .

Condensed from Banking

Wm. C. Johnstone, Agricultural Rep., Kentucky Bankers Ass'n

THIS is the story of a druggist, a bank, a nail keg, and a program.

The setting is at Middlesboro, a small industrial town in southeastern Kentucky. Here, just under historic Cumberland Gap through which pioneers passed from the coastal colonies to settle western frontiers, Kentucky corners with Virginia and Tennessee.

The bank is The National Bank of Middlesboro, founded in 1904 and never known to make an agricultural loan until two years ago; not until the druggist, Frank L. Lee, known affectionately by all thereabouts as "Doc" Lee became president of "The National."

The nail keg—where does it come in? Well, it's an important piece of furniture in bank President "Doc" Lee's office. It's where "Doc" sits as he develops his program or confers with his friends. Or, if the caller should be one of the more rugged individuals from the rural area, "Doc" might even offer him the honored seat. Somehow folks in that part of the country feel more at home on a nail keg than in an overstuffed chair, and "Doc" is one of those fellows who likes to make his callers feel at home.

Teamed-Up With Farmers

The program—you'll be surprised — is a farm program, hatched out on the nail keg by "Doc" Lee just after he became bank president in late 1952. Middlesboro was just then beginning to feel the postwar pinch. The city itself is relatively young, having been established by English capitalists in late years of the past century as a mining and industrial center. But now the big railroad shops were reducing their personnel and coal mining was on the wane. Should the community and the bank sit it

Reprinted by permission from Banking, November, 1955

out and wait for the coal industry's revival and the location of new industrial plants? "Wait" was not in "Doc" Lee's book of prescriptions, so he set out to do something with what he had. Just across the state line in Tennessee and Virginia are fertile valleys and rolling hillside pastures farmed by old pioneer stock; up in Kentucky the valleys were narrower and mountains steeper and higher but the people were interested in developing intensive agriculture on their limited acres. Berries, vegetables, poultry, and small dairy herds had a place under these conditions.

A Made-to-Order Program

So "Doc" Lee decided he would "team-up" with the farmers and help develop a more profitable agriculture in the community. The idea was not hard to sell to the directors. Frank Edwards, at that time vice-president and cashier, was enthusiastically behind the program and in a short time a farm department was set up. On March 1, 1953, Oscar Robertson commenced his services as the bank's agriculture representative. The selection of Mr. Robertson was a fortunate one. He was an "ag" graduate from the University of Tennessee; he had his military service behind him; and he had served as head agriculture teacher in adjoining Claiborne County, Tennessee, where he had been reared on a farm in the fertile Powell Valley, and he knew hundreds of farmers, their families, and their problems.

Fortunately, too, for Mr. Robertson, he did not have to lose time in developing a program. Both he and the bank management, and all the bank's personnel, knew what the farm department was to do and everybody "pitched" in to do it. The first job was to let the farm people know that "The National" was interested in them and their problems and would actually "stake" them in sound investments.

"The National's" banking hours are from 9 A.M. till 2 P.M. and during all these hours Mr. Robertson is at his desk along side of those of President Lee and Executive Vice-President Edwards. And a farmer can get quick service when these three go into a huddle.

As the doors close at 2 P.M. Mr. Robertson and "Doc" Lee start for the country, where they make personal contact with rural people, stopping to chat with a farmer as he plows his corn, sets his tobacco, or goes about his multiple chores. It's a friendly call with no mention of "The National" except a cheery farewell. "Come in and see us sometime." or "If we can ever serve you, let

us know."

Mr. Robertson might offer a timely suggestion about fertilizers, crop varieties, or livestock. In his car is equipment for taking soil samples if occasion should arise to use it. He has plans for poultry houses, dairy barns, farmsteads, and what not. He knows where a fellow can get a good bull, a used tractor, or a washing machine. A card record is kept of each farm visited and 1,400 cards are now on file, some showing as many as a dozen interviews.

But its in the field of community service that Mr. Robertson's time is best spent. He works with county agents, soil conservationists, and agricultural teachers in developing a long-time farm improvement program. He has helped develop a market for milk from new dairy herds and is now working on better marketing facilities for livestock and vegetables. Loan application forms have been developed especially for 4-H and FFA borrowers and many of these farmers of tomorrow are valued customers of today. The bank had just financed a combination tobacco and livestock barn for a FFA chapter.

Monthly Farm Bulletin

Each month a three-page agricultural bulletin is sent to 1,400 farm families in the territory. Besides timely farm suggestions it contains "get acquainted" items about "The National's" staff and friends, a page of "for sale" and "want" items, and sometimes a spicy joke or two.

The question most bankers ask about this farm department is "Does it pay?" That's the question I asked of Bankers Lee and Robertson and soon they had the figures before me. Since the farm department was started 18 months ago, about $750,000 in farm loans have been made without a single loss. The bank now has $350,000 in farm loans, helping to bring new wealth into the community.

The department showed a profit before it was in operation a year. The Middlesboro bank is one of the few banks in the area that continues to show an increase in deposits and profits since the postwar slump. Then there is another angle that can't be counted in dollars and cents. It is best illustrated by a remark of a farmer when "Doc," Oscar, and I visited him only recently. I complimented him on the fine job of farming he was doing. In return, with deep feeling in his voice, he said: "And those fellows at 'The National' are doing a fine job, too."

Farming on Formosa

An interesting view of agricultural life on the Island of Formosa

Condensed from Farm Research

Dr. David B. Hand

IT IS difficult for an American farmer to imagine farming under Formosan conditions.

What would farming be like if there were no surpluses and no price supports? This might be good. But what if, as on Formosa, there were almost no tractors, or horses, or dairy cattle, or grass land, or wood lots, or fences? Suppose that American farmers planted three to five crops a year on farms that averaged three acres in size. Life might be different.

Formosa is partly tropical and partly subtropical since the island is located on the tropic of Cancer. The warm climate, combined with an average rainfall of 100 inches, makes it possible to grow several crops a year. In spite of the heavy rainfall over half of the farm land is irrigated. The availability of water for irrigation determines whether more than one crop of rice can be obtained in the paddy land.

The climate is not always mild and gentle. The island lies in the path of frequent typhoons which, like our own tropical hurricanes, are given feminine names. Crop losses are heavy during these storms. In the winter, Taipie, the capital city in the north, is cold, windy, and wet.

Only 25 per cent of the land is arable and the rest is covered by rugged and almost inaccessible mountains. Rivers are short, steep, and subject to flash-floods. Large dams may silt up in five years. River beds may gain a 60-foot deep layer of gravel in a single flood. Earthquakes and landslides are common. The mountain scenery is beautiful and awe-inspiring, but there are no mineral resources.

Although Formosa is a relatively small island, about 250 miles long, it is inhabited by 10,000,000 people. Because these people are literate, industrious, and highly civilized, they are well worth our friendship and assistance.

The Formosan economy is es-

Reprinted by permission from Farm Research, Geneva, New York

sentially agricultural. Slightly more then 50 per cent of the people live on farms and 90 per cent of the exports are either agricultural products or are manufactured from agricultural products. It is not surprising that attention to agricultural problems is an important part of the U. S. aid program.

The U. S. is supplying loans and technical assistance to increase the yield of sugar and set free valuable acreage for other uses. Factories are being build which will be able to manufacture most of the fertilizer now being donated by the United States.

Extension work with the farmers is carried out by an important agency known as the Joint Commission for Rural Reconstruction, which was organized on the mainland in 1948.

Hundreds of projects are carried out in the fields of horticulture, animal husbandry, irrigation, forestry, economics, rural health, and sociology. Because the Formosans do not speak the same dialect as the technically trained mainlanders, it is necessary for the extension men to take interpreters with them. The valuable work of JCRR is appreciated and admired by all the rural people on Formosa.

There are over 300 farmers' associations that sell seeds, insecticides, animal feed, and other products much like our own farmers' cooperatives. Soybean cake, one of the major items of U. S. aid, is distributed to the farmers through the farmers' associations. In spite of the shortage of protein in the people's diet, this valuable product is fed to hogs. It costs $10,000,000 a year to supply the 3,000,000 hogs on Formosa with about an ounce of soy protein a day.

A major concern of the Formosan farmer is to keep his soil fertile. Every available bit of organic matter is returned to the soil. The farmers believe that the main value of the few hogs on every farm is in the production of manure.

Human sewage (night-soil) is also carefully saved, transported to the fields in earthenware pots, and allowed to "ripen" before being scattered on the crops. The odor pervades the air of town and country-side alike. This age-old practice is partly responsible for the prevalence of dysentery.

Agricultural experts on Formosa are not trying to do away with the use of night-soil. It is thought that an adequate ripening period or other treatment can make the practice hygienic. Consideration is being given to the treatment of sewage by communities rather than by individual families. Incidentally, in our own country we have lots to learn about the conservation of organic matter in sewage.

There are three main crops that far outweigh all others in importance: Rice, sugar, and sweet potatoes. Hogs are the most important livestock and are second only to rice in value. Rice is the main item of food. Sugar is the principal export. The sweet potatoes are intended primarily for hog feed. The hogs are the important "cash crop."

Other products include bananas, tea, citrus fruits, pineapples, papayas, mangos, litchi, water chestnuts, bamboo shoots, citronella, cassawa, ramie, wheat, soybeans, peanuts, tobacco, and a great variety of truck crops.

The practice of interplanting is very common. This means planting a second crop between the rows before the first crop is harvested. Vegetables are grown as a winter crop between rice crops. Sugar cane is commonly rotated with rice and a vegetable. A rice paddy may have fish swimming above the ground and water chestnuts growing below.

Sun-drying is an essential step in preparing rice and sweet potatoes for storage. Due to frequent rains this is often very difficult and sometimes 20 to 30 per cent of a crop is lost by becoming moldy or sprouting. Sun-dried sweet potatoes are a very unsatisfactory crop for human consumption, being dirty, sour, discolored, and infested with weevils. In spite of this, 25 per cent of the sweet-potato crop is eaten by people.

A farmer and his family work from dawn to dusk and, on the average, are able to produce about twice their own needs. By our standards this is a low degree of productivity. Every available square foot of land is tilled, from terraces on the hillsides to muddy flats in the river beds during the short intervals between floods. The extreme poverty, seen everywhere, is traceable to limited resources shared by too many people.

The lack of mechanization on Formosa farms is due primarily to the over-supply of labor. The introduction of machines is not feasible at present because this would put people out of work. However, it is safe to say that living standards in Asia will never be comparable with the West unless the productivity of labor on the farms is improved.

One of the most significant technological developments of all time has been the mechanization of rice farming in California. An acre of rice can be produced in the Sacramento Valley with about 15 man hours of labor, making use of airplanes, earth grading machinery, surveying instruments, mechanical harvesters, and dryers. In the Orient 900 man hours of "stoop" labor are required.

There is thus a potential de-

velopment in Asia that will have far-reaching consequences. The skills required for the mechanization of rice farming would be easy for the Chinese to learn. A way must first be found to draw the surplus labor off the farms and channel it into productive industries.

The number of people on Formosa is increasing by 300,000 per year. At this rate the population will double in 25 years. If this should happen the problems of the future will be worse than those of the present. The difficult problem of providing productive employment will be replaced by the desperate problem of producing enough food.

Multiflora Rose Makes Useful Fence

A multiflora rose fence will keep livestock at home, and it may keep soil at home, too. So says a newly revised leaflet by the U. S. Department of Agriculture which describes how and where to plant the multiflora rose, its advantages and limitations, and its cultural requirements.

Use of living multiflora rose fences has been increasing rapidly in recent years. They are cheap, easy to maintain, and effective in curbing farm animals and attracting wildlife. More recently, their usefulness for soil conservation and erosion control is being recognized after 15 years of trials and experiences by farmers working with the Soil Conservation Service and other conservation agencies.

Multiflora rose should not be confused with hedges of Osage-orange, says Mr. Tilson. Rose fences do not grow tall enough to shade adjacent farm crops or to require trimming when used along farm fields. Their roots are not widespread enough to reduce crop yields, and the rose thorns are not long enough to puncture tractor tires.

Rose fences are suitable for contour fences between cropland and permanent pasture and between cropland fields used for rotational grazing. Thy aid better land use by keeping livestock from large gullies, eroding streambanks, farm-pond areas, and woodlands.

Multiflora rose fences are not recommended for small city lots because of the space they would occupy—6 to 10 feet in height and width—though on suburban lots larger than ½ acre they may be useful as a barrier at the rear of the lot.

University of Kentucky

Tree Farm Casts Its Shadow Far

Two million pine seedlings planted by a railroad replace an old sandpit and serve as a public demonstration

Condensed from Soil Conservation

R. A. Malone, Public Relations Rep.
Texas and Pacific Railway Co.

ON a picturesque 133-acre tract of land in the rolling hills country of northwestern Louisiana there is a most unusual facility of the Texas and Pacific Railway Company. It's a railroad farm—T&P's Tree Farm!

On certain days during the past few years, passersby may have been somewhat amazed to see forestry workers on this railroad property. They might have noticed a tractor-pulled 8-disc plow circling the fragrant pine-covered hillsides, plowing up a 15-foot-wide lane. It's a fire lane, protection against forest fire.

They might have seen a sled-like apparatus also being pulled by a tractor over certain stretches of flat sandy land amid this sprawling wooded sector. If close enough, they would have seen a forestry worker on this woodland toboggan deftly inserting pine seedlings in the rows cut by its plow blade. This machine is a mechanical tree planter and little lobolly pines were being planted.

Onlookers hardly could have seen other workers down in the gullies on this land. But, they were there. Some might have been using a paint gun, squirting little dabs of paint on the trees—trees they were marking for deadening or for cutting. Other workers might have been using a spade-like implement in these gullies or in the stump areas. This implement, a forester's bar or dibble, is used as the fastest method of seedling planting in places not accessible to the mechanical tree planter.

Reprinted from Soil Conservation, Washington, D. C., March, 1955

These forestry folks on this railroad land were woodland-wise workers of the Upper West Red River Soil Conservation District and woodland conservationists of the U. S. Department of Agriculture. During these past few years they have been transforming this T&P property, formerly a sandpit, into a budding tree farm.

When the railroad acquired this property, a half-century ago, it bought the land, not for a tree farm, but to provide essential sand and dirt needed to build up the right-of-way for its trackage through the Bayou State. The deep pits and gullies are mute evidence of the transfer of tons of sand and dirt for the railroad roadbed.

For a long time, however, T&P hasn't used this old sandpit, and towering native pines have grown up there.

Just 4 years ago, without any fanfare whatsoever, the Texas and Pacific, concerned with the conservation of the natural resources of the nation, started a reforestration program on this old sandpit property in cooperation with the Soil Conservation Service of the U. S. Department of Agriculture.

Conservation, like T&P tonnage, covers everything, and it has a tremendous effect upon the national economy. It is becoming more and more evident and essential that the soil, water and forests must be conserved. Woodlands, properly managed, conserve not only timber but soil and water as well.

A tree farm, of course, cannot be developed overnight. While it's true that it takes time—for timber to grow, actually Mother Nature is a poor developer in comparison with the woodland conservationists of the Soil Conservation Service.

It was the hope of the Texas and Pacific that these colorful acres, in time, would serve as a model tree farm for the benefit of timberland owners to illustrate how even an old sandpit can be turned into a woodland wonder. To a certain extent that hope of the railroad *already* has been realized.

The birth of this unique railroad project started in the summer of 1950 during a casual conversation between two oldtime friends, both of whom long have been concerned with the promotion and conservation of Louisiana's agricultural resources, State Conservationist H. B. "Joe" Martin and T&P Agricultural Agent Earl P. Barrios. The talk drifted around to the old railroad sandpit. Barrios wondered about converting it into a tree farm, perhaps?

"I can't think of anything that would be more influential and effective than for the T&P to

turn this land into timber, to practice good timber management on your old sandpit tract," said Martin.

That was the beginning. The building of this "building" tree farm started the next spring, in 1951, and has been in effect since.

Expert forestry methods, technical guidance and assistance have been provided through the Upper West Red River Soil Conservation District.

The woodland plan being followed by the railroad and the technicians is a seven-point program: (1) protect from fire and grazing; (2) thin dense clumps of trees; (3) follow time schedule in cutting operations; (4) take crop trees at rate of one per acre per year; (5) take poorest trees first to improve quality of woodland; (6) remove absolute culls (inferior trees) by girdling, felling or poisoning; and (7) plant or underplant open areas not reseeding naturally.

Trees are thinned to what is called "D-plus-6 spacing." To determine the space required for each tree, an average diameter of the trees is calculated and to this average figure, 6 is added. The sum, oddly enough is called feet. For example, three trees 8, 10 and 12 *inches* in diameter have an average diameter of 10 plus the 6, to make 16 *feet* required for proper spacing between the trees.

Diameters are calculated by using a woodsman's rule, holding it at arm length against the tree trunk and about 50 inches above ground, which is about breast high for the average woodsman. "DBH" (diameter breast high) is a standard term in the timber world.

In following the time schedule, a general cutting is made every 6 years. It is significant, however, that this cycle is not necessarily followed in the thinning of pulpwood and post-sized trees.

Culling inferior trees in a woodland is the same as keeping weeds out of a cotton patch or a cane field, it prevents worthless vegetation from reducing the yield. Culling allows ample room for the remaining trees to grow and develop, permitting adequate sunlight and soil moisture to penetrate and increasing thereby both the quantity and quality of merchantable timber.

Trees are marked distinctively for selective cutting and for deadening. Those to be cut for merchantable timber are marked with two little dabs of paint (usually white or yellow on Louisiana timber) with one splotch about breast high or higher and the other near the ground. Culls are marked with an "X."

There are three general methods of deadening trees: felling, poisoning and girdling. A girdle

on a tree is a band cut around the trunk about 3 inches wide and just deep enough to clean off the bark and thus kill the tree. It requires skill. If cut too deep, undesirable sprouting often results. An expert axe-wielding woodsman, believe it or not, can girdle a 22-inch DBH tree in a mere few minutes.

And speaking of speed in forestry, the Service-directed timberland workers with a mechanical planter can plant from 1,000 to 1,500 seedlings *per hour.*

The first planting of pine seedlings on the tree farm, which is located just on the outskirts of Shreveport, was in January 1952, when 10,000 seedlings were put out. The next January some 25,000 more seedlings were planted, with an additional 35,000 planted in December 1953. This last December approximately 30,000 more were planted.

The seedlings set out were loblolly pine, which seems more suited to climatic conditions in Louisiana's Caddo Parish than any other of the many varieties of pine. And, actually, most of these loblolly seedlings were replantings.

The drought has taken a fearful toll each year since the tree farm started. Despite this continuing drought which has killed so many seedlings, the Texas and Pacific has gone ahead in this project and has not hesitated to replant. It's encouraging to note that most timberland owners in this section of Louisiana have followed suit and also have replanted.

Proximity of the tree farm to the soil conservation district's Shreveport office makes it convenient to show interested persons various phases of timber development work being carried out on the railroad property.

"Classes of school children, even those not yet in their teens, have toured the tree farm here," said Harry Hammet, work unit conservationist. "And in addition to these youngsters, the timber management plan on this old sandpit property is serving as a model demonstration."

In Caddo Parish the district has made amazing progress in the past few years in promoting more planting of trees, conservation, and proper timber management.

Prior to 1952, practically no pines were planted in the parish, but since then the number planted in Caddo Parish through this fine work has increased almost tenfold each year. In 1952, 75,000 seedlings were planted; in 1953 the number jumped to 721,000; and last year, the figure was 1,317,200.

Such progress is truly remarkable, and casts an optimistic light on the future of the timber industry in this section.

Chinese Chestnut Gains Favor

This chestnut from the Orient may eventually replace our native chestnut killed by the blight . . .

Condensed from Southern Planter

Robert R. Bowers, West Virginia Conservation Commission

WE have all but lost the American Chestnut, but we now have a tree that can partly fill the gap left by the passing of these great nut producers.

It's the Chinese chestnut, which has survived the blight since the beginning of time. It hasn't the height, the shape or the tolerance of poorer soils of our American chestnut, but its nuts are good and it produces them abundantly.

May Make Money In South

If given a little time, the Chinese chestnut may soon be making the Southern farmer as high as $50 to $80 a tree every other year. The tree should live to be 100 years old, and start producing nuts at the rate of 100 pounds annually at 15 years. I bears at around six years, but with age the crop of nuts gets heavier.

The weight of these chestnuts varies from about 50 pounds per bushel when green to considerably less when dry. The nuts bring from 50 to 80 cents a pound at present with nearly every one of them going back into seed. The future certainly looks bright for the chestnut tree grower.

The nuts of the Chinese chestnut are good eating when handled properly, but some of them are completely tasteless. Since it seems that the nuts produced and planted will grow trees bearing nuts tasting exactly the same, it would be a good idea to sample the nuts you are going to plant in order to assure yourself a tasty crop.

If and when you decide to give chestnut growing a try, be sure of the source of the nuts and stock planted. Your crop will be only as good as the stock from which they come.

However, don't judge the quality of the nuts on size alone, for due to the ability of the Chinese chestnut to bear heavily, nuts are usually much smaller than the American variety.

Reprinted by permission from the Southern Planter, Richmond, Va., Jan., 1955

These trees can be grown for the nuts or for timber. Plant trees 12 feet by 12 feet if you want timber, and 30 feet by 30 feet if you want nuts. The bigger the crown of the growing tree, ordinarily, the more nuts produced. Use planting stock that is well rooted and at least a foot high; preferably 18 inches or more.

Produce Nuts Or Timber

The Chinese chestnut likes good soil, and it is a big enough income producer to warrant some of the better farm land. Rich, well-drained soil is a pretty safe measure of any land you want to grow chestnuts on. These trees can stand some slope, but not too much. They like lots of water up to a point, but don't plant on heavy limestone lands or on heavy clays.

Thin soiled mountain ridges and slopes are not the places for this chestnut. These trees like mulch, cultivation and fertilizer. When first planted put about one-fourth pound of a good fertilizer around them. Water your trees during dry weather, if possible.

The best time to plant the chestnut probably is in March or April, but in the Southeast where too much frost heaving is not common, fall plantings will work out well.

Plant In Fall Or Spring

One big disadvantage to planting the Chinese chestnut in fall is that mulching is usually advisable. This mulching in fall tends to draw mice during the colder weather and these rodents love the roots of young seedlings and sometimes actually girdle the trees. Likewise, rabbits often clip the smaller trees during winter. Be sure to protect the trees from grazing livestock and by all means from fire. Either of these can wipe out your stand.

For anyone interested in getting into the chestnut growing business, it is a good idea to contact a local nursery for the planting stock. Locally grown stock has a much better chance of survival than stock brought in from outside the state or region.

Whether it's a grove of Chinese chestnut trees you want or a whole orchard, your planting will be like putting money in the bank.

A new record was set for egg production during November, 1954. The record was six per cent above the corresponding month of 1953 and 41 per cent higher than the ten-year average for November. If poultrymen wondered about the low prices that they received for eggs, this record of production should indicate to them that the supply is much greater than ever before, thus creating a surplus.

CORN IN SOD

Corn and timothy sod battled hard for scarce soil moisture in this Rutgers' experiment . . .

Condensed from the Pennsylvania Farmer

C. R. Skogley and *G. H. Ahlgren*

NORTHEASTERN soils harden when they are exposed to the summer sun. They form an unfavorable crust and rainfall often runs off instead of sinking into the soil. A good way to avoid this rain loss and runoff is to put a mulch or cover on the surface of the soil.

Growing corn with mulch has been attempted by various agronomists and farmers. Manure has been used to mulch corn with good success but it is a costly procedure. Recently cover crops such as rye and ryegrass have been chopped and left on the surface and corn planted with a mulch planter. The success of this practice has varied somewhat but it holds some promise.

Probably the largest drawbacks to mulching corn at present are: (1) cost of specialized equipment, (2) high power or labor requirements, and (3) competition for moisture from weeds and grasses between the rows. This latter may be especially severe in a dry season or drouth period.

In 1954 experiments we attempted to see if certain of these problems could be partly overcome. Accordingly, we tried to substitute cheap chemical power for some of the mechanical power requirements. The same chemical was used for control of weed and grass growth between the corn rows.

The chemical selected was an organic arsenical known as monoethanolamine arsenite. Previous experience indicated that it is a powerful killer of all plant top growth. Also it is quite cheap and may be used at low acre

Reprinted by permission from the Pennsylvania Farmer, Pittsburgh, Pennsylvania, February 12, 1955

rates, and therefore could be practical. It does not affect later soil productiveness since it is rapidly fixed by the soil.

Rotary Tiller

A light tractor with a 50-inch power take-off rotary tiller was used to prepare the seed bed in a timothy sod. All of the blades were removed from the tiller except the two outside rows on either end of the shaft. This permitted two strips to be prepared each 11 inches wide and five to six inches deep with 28 inches of timothy sod left intact between rows. It also gave a 42-inch row spacing.

A crop of timothy was harvested for silage and the field laid out into 13 separate treatments and planted to corn. The treatments ranged from check plots where the corn was plowed and later cultivated as in normal culture to untreated sod plots neither sprayed with chemicals nor cultivated throughout the season. Between these extremes the arsenical spray was applied at rates of 5, 10 or 20 pounds per acre. Some plots were sprayed before the corn emerged; others after. Also some plots were sprayed only once, others twice, and still others three times. Shields were used around the nozzles so that no spray came in contact with the corn. Thus we attempted to stunt the timothy sod and produce a mulch from it to benefit the corn.

Following preparation of the strip seed beds, fertilizer at the rate of 725 pounds per acre of a 10-10-10 mixture was banded below and to one side of the corn seed. In July 250 pounds per acre of ammonium nitrate was side-dressed. Weeds in the corn row were controlled by a pre-emergence treatment of 2,4-D ester.

Moisture content and nitrogen tests of the soil for the various treatments were taken regularly since these could give us clues as to the reason for the response of the corn.

It was soon evident that the more live sod present the less water in the soil for the corn. The highest soil nitrate content was found on the plots under sod that received the largest application of arsenical. From this it appears that moisture and not nitrogen supply was the limiting factor.

Yields

The check plots averaged 89 bushels per acre of shelled corn containing 15.5 percentage moisture. The sod with no chemical spray to stunt the timothy averaged only 30 bushels. Those sod plots receiving the 30 pounds of arsenical spray (20 pounds preplanting treatment plus two treatments of five pounds each dur-

ing the season) yielded 43 bushels per acre. It is evident that the sod and weeds between the rows must be fully controlled or killed and competition for moisture eliminated or corn grain yields will suffer.

In raising corn in sod for silage we made out somewhat better. By harvesting timothy for silage in May we obtained 1.8 tons green forage per acre. Harvesting the corn plus timothy on the sod plots in October gave us 7.5 tons green forage per acre for a season average of 9.3 tons per acre of corn silage that we obtained from corn alone on the plowed plots.

The 1954 season was the driest on record in New Jersey. With normal moisture more favorable results may have been obtained. Also our present chemical sod stunting program was inadequate. The timothy was not inhibited enough and competition for moisture was too severe. However, moisture seemed to be the only limiting factor since no other deficiencies could be found.

Having found the most serious limitation of this corn cropping system we can modify our approach in 1955.

Open Sheds Better For Dairy Calves

Open sheds for dairy calves are better than barns or closed sheds, according to D. C. Brown, Wyoming Agricultural Experiment Station dairyman.

He says research workers have found that calves can stand low temperatures. Their studies at Laramie show that Holstein dairy calves will thrive in open sheds under all kinds of weather—even temperatures of 20 degrees F. below zero and lower.

More important than temperature, he says, are air movement, freedom from drafts, and lack of dampness. Deep, open sheds provide better housing and help prevent frostbite during extremely cold weather.

Calves in open sheds are healthier—with less pneumonia and other ailments—than those housed in barns or closed buildings. In open sheds they also gain 5 to 10 per cent more in weight.

Open-shed housing is more economical to build and to keep calves in. Brown mentions other advantages of open sheds—calves in open sheds require about half the bedding needed in barns, and less labor is needed for feeding, bedding, and cleaning in open-shed pens.

University of Wyoming

Funny Story Clearing House

There's a story about a Portuguese monastery located on the top of a 300-foot cliff. Visitors to the monastery were strapped in a big wicker basket at the bottom of the cliff, then pulled by hand to the top with an old ragged rope. Naturally the journey was fearful and as one visitor was about to step into the basket for the return trip to the bottom of the rocky valley he had a thought.

"How often,' he asked a monk, 'do you get a new rope?' To which the monk calmly replied, 'Whenever the old one breaks.' "

Lewis-Shepard Lever

A Texan, hearing that a factory in Ohio was interested in buying bullfrog skins, wrote that he could supply any quantity up to 100,000. Needing the skins badly, the factory wired him to send the entire 100,000.

About 10 days later a single dried frog skin arrived with this note: "Gents: I'm sorry, but here's all the frog skins there were. The noise sure fooled me."

The Rotarian

"Last night," the young man told his friend, "I had the sweetest girl in my car! When we came to a lonely place I wanted to kiss her, but she said, 'I'd like to see the stars when you kiss me. Why don't you take the top down?' So after working an hour I finally got the top down and . . ."

"An hour?" interrupted his friend. "Why, I don't need more than 2 minutes for that!"

"Yes, but you don't have a hardtop car!"

Revue, Germany

An army officer, home from strenuous service in Korea, was given a desk job in the Pentagon. Everyday for a week he shifted the location of his desk, finally winding up in the men's wash room.

"You must be shell-shocked," friends told him.

But the officer had a ready explanation, "It's the only place here where people seem to know what they're doing."

If you have a funny farm story you would like to see published, send it to Farmer's Digest, Fort Atkinson, Wisconsin. Stories will carry an author's credit line.

Speculation or Gambling?

An interesting, comprehensive article in two installments about trading in grain and cotton futures. Written by a man who has made a personal hobby of studying the commodity exchanges . . .

Morris Braun

ON January 16th, 1926, the Senate Committee on Agriculture and Forestry, without benefit of wide angle shots or coast to coast hook-up, held public hearing. Questions and answers droned onto the record. Occasional arguments lit up the subject under investigation—should trading in grain and cotton futures be forbidden, if there was no intent to deliver or receive the actual merchandise?

Our legislative branch, for the uncounted time was trying to learn if the price of our daily bread and clothing were just chips on a green-baized table or if speculation in their prices should continue. Dr. J. W. Duvel, in charge of the Grain Futures Administration was on the witness stand.

The Chairman, Senator Norris of Nebraska made the Committee's position clear. Reminded that the farmer could not help but speculate, he said, "But there are thousands of other fellows that we want to prevent gambling. We want to prevent those fellows from dealing in futures as a matter of speculation. How can we do that and still let legitimate hedging proceed?" The Senator continued, "What happened before this dealing in futures was established," he asked, "prior to its establishment? Was there any complaints about manipulation of prices then, any complaints by the farmers of manipulation of price?"

"I take it this way," Dr. Duvel said, "in the production of our grain or agricultural products or anything, there is always a complaint. The seller feels much that he does not get enough and the buyer feels he pays too much, and whatever system you have, you cannot satisfy both."

Sixty odd years of widely heralded investigations by Congressional and State bodies had

An original article printed by permission of the author

rolled up an impressive score of deaths in courtroom brawls or in committee. But this one was not dying. The Senators looked at speculation as a way of life. But gambling was being frowned upon, again.

The commodity exchanges were concerned, in spades; the organized farm groups were interested and angry; the politicians were groping.

What happened before the dealing in contracts was established? Take the case of a family I'll call the Freys. Young Sam made his application as a Mexican War veteran, packed his trunk and bride into his covered wagon and took the long trip westward from Boston to downlake, Illinois. At Chicago, he stopped at a farmer's supply dealer, recommended by Etta's brother, a well-traveled peddler. Looking the stock over, he ordered his supply of needed hand tools and a plow. The plow he wanted was not in the shop.

"Tell you what you do," the dealer advised Sam, "You pay for it now, and the next one I get in, which should be in about two or three months, I'll hold it for you to pick up. The demand is heavy now, what with the homesteaders coming in, and I can't get too many at one time. When I get them in they go pretty fast." This sounded reasonable to Sam. He packed his other tools and supplies into the wagon and had Etta put the contract in the trunk. He had bought a plow future.

Without the plow, Sam and Etta cleared ten acres on their farmstead near the Indiana line, with the help of Will Parlen, their neighboring homesteader. As their supplies dwindled, Will helped out and arranged Sam's credit with the friendly peddlers until Sam's garden produced the fresh vegetables to add to his forest-stocked meat supply. When Sam picked up the cash plow in the fall, the ground was too hard for turning up. Will advised him to plan for spring planting and suggested that the best cash crop would be wheat. In the meantime, they could both do some clearing on their land and improve their homes.

As the roads thawed into skimiced mud, Ben Partridge, the friendly peddler, left his wagon at the field to follow Sam about his plowing chores. "What are you seeding?" he asked.

"I figure on about twenty acres of wheat, but I'll have to work it alone. Etta is pregnant and I think it best she stay around the cabin. And I owe you plenty for seed, Ben. I'm mighty grateful."

"Now see here," Ben said. "It's my business to see my customers well off. You'll need some money to sort of take care of things

when the young 'un is around. Thinking of selling your wheat?"

"Why Ben, I haven't planted it yet. How can I sell what I haven't got?"

"You have the land. You have the seed. You're plowing and you plan to plant wheat. They all add up to wheat. I'll pay you right now for the crop when you get it in. If I remember, when I left Chicago, the price was 76c a bushel. I'll give you 79c for 1,000 bushels and pick it up here after the harvest."

"But," Sam said, "I certainly will not have 1,000 bushels for you. And I don't like to get paid for what I can't deliver."

Ben was patient. He explained that if Sam's crop did not come up to the 1,000 bushel mark, Sam could buy the paper contract itself back. The deal would do two things for Sam; it would give him assurance of a price for his crop, and maybe a little profit if the value of the paper contract went up in price.

This made sense to Sam. He signed the contract; he hedged his crop by selling his wheat for future delivery, and he was short the actual grain. Ben took the futures contract back with him to the new-born trading post in Chicago. Maybe he could sell it at a profit on the curb at the Gambler's corner.

Even before Chicago first revealed itself to a startled America in the 1840 census, that breeding ground of giants was a natural. The lakeside metropolis just wooden-sidewalked the mud to clear the movement of wheat to market. The flow was directioned by newly-developed canal, steam railway, road and lake, in from the surrounding countryside. At harvest time it poured if the weather was and had been right; and sunk to a whisper when the lake and canal froze over if the crops did not fulfill their planting promise. The heavy flow sunk the price; but when it just trickled or stood still, the price rose. Insurance against a drop in market price after harvest, was not to be had. The insurance companies then, and now, feel that the price changes are too sure to happen. The insurance angle is based on the understanding that what they receive as premiums must be larger than what they pay out for claims, a sound business rule indeed. They just cannot figure the arithmetic of price changes leaving them with a profit.

Mr. Pioneer Trader in the Chicago wheat market had large experience in frontier weather and crop conditions. As the farmer sold his wheat sometimes at a profit, but just as often not, Mr. Trader in parts, became a country dealer. Instead of waiting for the grain to arrive, he went to the farmer and bought

the crop in the ground. If the farmer did not care to sell at that time, he could wait for the market price at any time that was convenient for him. But what had been purchased in the ground, or in the granary, was price insurance to the farmer or dealer, who were thus able to hedge their investments against future price. Whoever bought the paper contract could sell it too, at whatever price he could get, if there was a market for it. If you had the wheat to deliver, you were speculating; if you bought and sold the paper contract with no thought of delivering the wheat itself, you were gambling. That is the law.

The government, the speculators and the farmers all agree that a speculator buys or sells, expecting to make a profit; a gambler only bets that a certain thing may happen. At that, agreement ends.

The Chicago Board of Trade in 1838, shipped 78 bushels of grain, just one year after Chicago's first spectacular real estate boom and bust. The city's first election, also the year before, drove home to the wheat traders the salable value of honesty. In a world of what-the-dickens, the directors insisted on integrity being written into their charter granted in 1859. History and banking credit have proven that the members are marketing men of absolute integrity; enough cash is required for the customers to assure that quality on their part. The Gambler's Corner was replaced by a closed-in space for the trader to buy and sell his actual wheat or paper contracts for its future delivery. The Chicago Board of Trade was in business, destined to handle more than 90% of the world's trade in wheat futures contracts.

The traditional trading stalls were built as pits, with steps encircling them, on and around which the members could buy and sell their paper contracts, but only from each other. They could also act as brokers for any nonmember, affectionately called the customer. Pits were provided for each grain and separated, one for the 5,000 bushel lot, one for the job lot of 1,000 bushels; and the cash grain counter, the last provided with means for inspection of the actual, or cash grain. If you bought a paper contract for 5,000 bushels of wheat in January, agreeing to take delivery in May, and did not sell the contract before then, you were bound to take the cash wheat in May. In May though, your contract was no longer in the futures pit; you were compelled to take the cash wheat over the wheat counter, where the actual grain could be inspected and graded.

The offer made by the Chicago Board of Trade was a convenient hedging market for the farmer and dealer, plus an active market created by the trading members. The fixed location, the honor and good credit of its members, and the published change of prices were valued sales arguments, but above all the magnet was a market where deals could be made within a matter of minutes. If the farmer sold only to the dealer or trader, and the traders sold only to each other, the result for the farmer and the dealer to trade was to pay their expenses and make a living. Something else was needed—a busy market created by risk-bearers who would act as insurers against the changes in price and be willing to take the losses. Or profit.

Sam Frey's youngest had heard tell. On bivouac during the march southward, Henry had listened to one of the Indiana volunteers boast about buying May wheat in January of '60 for 69c a bushel, and selling his contract for $1.09 in April, cleaning up a tidy little profit of $2,000. He remembered. The lining of his gunsights in the leafy fastness of an up-ridge oak at Shiloh, the flash of blue and gray, the booming of cannon were just bits of background. What could be simpler than to get advice on the weather and crops and then turn a little profit on the upswing in the market price? The odds were two to one, certainly better than a horse race. And he was an insurer to Dad's crops, too.

Mustered out after Appomattox, Henry visited a broker in his home town. He asked the price of wheat and received the telegraphed information that it had just been sold in Chicago for $1.38 a bushel. What were the requirements to buy a lot of 5,000 bushels, he asked, telling the friendly broker that he could hardly invest $6,999, mostly because he did not have it. But he still thought wheat for December delivery was a sound investment at the right price.

Henry's broker assured him that if he could put up a margin of $200, that would be enough for security, and he could buy or sell any contract he'd a mind to. Of course, the broker added, if you go along and buy, and the price goes down 5c a bushel, more margin would be needed. What an opportunity!

Henry studied the market reports at the broker's office as any sound investor would do. Should he go short and sell? He took his time and waited for December wheat to slip back to $1.14. His order to buy went in; he was long 5,000 bushels at $1.13 and watched the telegraphed prices change. He talked

shop, every day. By September his December wheat contract was selling at $1.43 a bushel; he sold at a profit of 30c a bushel, making a profit of $1500 on his investment of $200. More than 600% profit. Not bad at all.

His orders had been carried out in the wheat pit, burning with bids and offers. As his orders to buy and sell went in, another trader in the pit sold and bought his contract. Orders zinged back and fourth on account of the pit traders themselves, as well. Each had ideas of his own. Including B. P. Hutchinson.

Mr. Hutchinson proceeded to buy all the available cash wheat there was in Chicago at the time, about a million bushels. He also offered to buy any contracts in the pit that the holders cared to sell. The holders sold, asking for more and more. The price of wheat went from 78c to $2.55. The pit traders figured that B. P's capital must run out about this level; they turned bearish and sold futures short at prices from $2.00 to $2.55. They knew if the price dropped further they could buy back the contracts at a cheaper price and bite the profitable difference out of Old Hutch's hide. Mr. H. poured it in, and as the price slipped back, bought more contracts. Prices surged higher in a bull market, loaded by old Hutch. When delivery day rolled around, trading left the futures pit and swirled around the cash wheat counter. Old Hutch applied the squeeze; he asked the sellers to deliver the actual wheat, which he owned himself. To deliver, the bears could only buy from Mr. Hutchinson. He asked $2.85 a bushel for the cash wheat, got it and delivered the wheat to himself. After the delivery by him to him, wheat dropped 90c in one day. A successful corner had been run.

And what happened to Sam Frey's youngest, the little old Civil War veteran? Oh, nothing in particular. He was just a little older farmhand, helping his brother Amos.

As wheat had fallen back to $1.05, he had bought another 5,000 bushels and took a paper profit of $900 more when it shot back to $1.23. His profit was now $2400. Wheat kept pushing higher on the Hutchinson play; he bought two contracts totaling 10,000 bushels at $2.75 and watched trading go off the futures pit and sell for $2.85 as cash wheat. Who wanted a measly $1000 profit on the deal?

When cash and contracts started to slide down the hill built by Old Hutch, Henry was patient, knowing a bottom is always reached. When it hit $2.54, his broker told Henry that his profit of $2400 no longer existed; the broker wanted $1000 more margin. Henry put it up. When it

hit $2.44, the broker asked for $100 more. Henry put it up. When it hit $2.34, the broker asked for you-know-what more. Henry couldn't put it up. His contracts were sold; he was out of the market with a $2200 loss. It was comfortable to have Amos to go back to.

The occasional plunger hi-diddled but by and large, the professional traders on the Chicago Board of Trade were, and are held high in financial esteem; both as credit risks and as market men of integrity. The honesty so rigorously demanded by the Board of Directors has paid off. Each member is on his own otherwise, and earns his income from trading and commissions year in and year out.

To be concluded next issue.

Wasted Feed

Weather prophets differ as to whether or not the dry cycle is about to end. If 1955 turns out to be another dry year like the past several years, dairy and beef cattle growers will be hit hard again and once again next fall there may be an emergency hay and feed distribution program. Yet, the probability is that this spring enough feed will go to waste on a lot of farms to see the beef herd through a summer or fall drought in fine shape.

The feed that will go to waste is the surplus grass and clover that is lost each year during the lush spring growing season. During the height of the spring growing season, even a rather poor pasture may produce more grazing than the cattle can take care of. That extra grazing is lost and goes back into the soil—unless it is cut and put up as silage for use in the dry and cold months that come later in the year, when pasture may be scant or even non-existent.

Properly put up, this silage loses very little of its food value. And modern methods and equipment have taken much of the drudgery out of silage making. Many thousands of tons of spring grazing could be saved in this way. It could mean the difference between profit and loss on many farms later on.

Silage making may not be as spectacular as some drought damage remedies that have been proposed. But old-fashioned ways still are sometimes best. That surplus spring grass and clover can be made one of the South's most valuable assets.

Louisiana Extension

About one-eighth of all crop production in the U. S. depends totally or in part, on irrigation.

ONE YEAR CONTINUING INDEX

BEEF CATTLE

Hurry-Up Hormone .....June 1954
A Good Herdsman .....June 1954
Rumen Industries .....Aug. 1954
Need More Culling? .....Aug. 1954
Cattle Gains Too Costly? ...Aug. 1954
This Feeding Game .....Aug. 1954
Grade-Up Beef Herd .....Oct. 1954
Can't Afford Not Feed Beef Nov. 1954
Rapid Gains in Beef .....Dec. 1954
How They Win in Texas ....Dec. 1954
Mahon's Beef Oasis .....Feb. 1955
More Beef from Pastures ...Feb. 1955
Pencil Packing Cowman ....Feb. 1955
Raise Your Feeders .....Mar. 1955
Feeding Hormones .....May 1955
Make Sure Cows Gain Fast ..May 1955
Stilbestrol Feeding .....May 1955

CONSERVATION

Washington County .....June 1954
Poverty Ridge .....June 1954
Built Back His Farm .....June 1954
Failure to Success .....Aug. 1954
Way to Stop Gullies .....Aug. 1954
Reclaiming Rough Pasture ..Oct. 1954
Farms From Abandoned Land Nov. '54
Bigger, Deeper Ponds .....Nov. 1954
Floods Start at Hilltop ....Dec. 1954
Grass and Water .....Feb. 1955
Fur Crops .....Feb. 1955
When It Rains .....Mar. 1955
Pay-Off in Conservation ....May 1955
Put Eroded Soil Back .....May 1955

CROPS

Tetra Petkus Rye .....Oct. 1954
Once Over, Ready to Plant ..Nov. 1954
Dry Corn in Crib .....Nov. 1954
Cash in Cover Crops .....Dec. 1954
Rotation a Hot Issue .....Jan. 1955
New Plant Disease Control ..Jan. 1955
New Era Cornstalk .....Jan. 1955
How Wis. Grows Best Corn Feb. 1955
Bamboo: Big Grass .....Mar. 1955
Deep Cultivation .....Mar. 1955
Band Seeding .....Mar. 1955

DAIRY CATTLE

Test Tube Magic .....June 1954
Milk 84 Cows in 2 Hours ....Aug. 1954
Frozen Semen .....Aug. 1954
New Dry-Milk Bread .....Aug. 1954
Heifer Plant .....Oct. 1954
Milk at Low Cost .....Oct. 1954
3 Years of Loose Housing ..Oct. 1954
Feeding Dairy Calf .....Oct. 1954
Artificial Breeding Grows ....Oct. 1954
Control Mastitis .....Nov. 1954
We Need Better Cows .....Nov. 1954
Save in Calf Barn .....Nov. 1954
15 Good Cows .....Dec. 1954
More Milk Per Farm .....Dec. 1954
Stretch Feed Dollars .....Dec. 1954
8 Steps to Clean Herd .....Jan. 1955
Pipeline Milking .....Jan. 1955
Artificial Insemination .....Jan. 1955
Mastitis Control .....Feb. 1955
Art. Breeding vs. Nat. Serv. Feb. 1955
Artificial Breeding .....Mar. 1955
High Breeding Efficiency ..Mar. 1955
Milk Per Hour .....Mar. 1955
Dairy Bargain .....Mar. 1955
Need Longer Stalls? .....Mar. 1955
Bulk Milk Collection .....May 1955

FARM BUILDINGS & SHOP WORK

New Idea Farm Buildings ..Oct. 1954
Adjustable Cattle Feeder ....Feb. 1955

FARM MANAGEMENT

Chores Done Peacefully ....June 1954
Better Buy Than Labor ....June 1954
435 Farmers Own Farm ....June 1954
Why Farm Half the County June 1954
Don't Follow the Season ....Aug. 1954
Class Leader Farming .....Aug. 1954
Made Poor Farm Pay .....Oct. 1954
Measure Your Farm .....Oct. 1954
Use Market Reports .....Nov. 1954
Farm Fire Stoppers .....Nov. 1954
Future Is Farming .....Nov. 1954
Future of Farming .....Dec. 1954
Quality Small Farm .....Dec. 1954
Social Security for Farmers Dec. 1954
Agricultural Act 1954 .....Dec. 1954
Report on Farm Land Prices Jan. '55
Father-Son Agreements ....Jan. 1955
New Income Tax Law .....Jan. 1955
Your Stake in Social Security Jan. 1955
Own Your Own Farm .....Jan. 1955
What's Ahead for '55 .....Jan. 1955
Advantages Flexible Sup'rts Feb. 1955
Drought, What To Do .....Feb. 1955
Income Tax Savers .....Feb. 1955
Help Your Tax Counselor ..Feb. 1955
Grow & Sell Grain .....Mar. 1955
Pays To Borrow .....Mar. 1955
Cut Production Costs .....Mar. 1955
How To Start Farming .....May 1955
Father & Son Farming .....May 1955

FARM EQUIPMENT & MACHINERY

Power Feeding .....June 1954
Barn Hay Drying .....Aug. 1954
Good Water from Pond ....Aug. 1954
Fog Fire Fighting .....Aug. 1954
Owns Machines in Part'ship Oct. 1954
Fair Custom Rates? .....Nov. 1954
New Tractor Power .....Dec. 1954
Fog for Fires .....Dec. 1954
Mobile Farm Shop .....Jan. 1955
Tractor Clubs, Safe Drivers Jan. 1955
Aircraft in Agriculture ....Feb. 1955
The Farm Shop .....Mar. 1955

FEEDS

Coarse Grain or Fine .....June 1954
Quality Feeding Program ..June 1954
Grind, Mix Own Feed .....June 1954
Feed More Roughage .....Aug. 1954
Feeding Molasses .....Aug. 1954
Trace Minerals for Animals Oct. 1954
Ration Protein with Salt ..Oct. 1954

FERTILIZERS

Leaf Feeding .....June 1954
More Lime Needed .....Nov. 1954
Fertilizer and Irrigation ....Nov. 1954
Extra Nitrogen for Residues Dec. 1954
Save $14.00 on Nitrogen ....Jan. 1955
What Happens to Nitrogen Jan. 1955
Nitrogen—Growth Element ..Fed. 1955
Super at Plow Depth .....Feb. 1955
Fool's Gold .....May 1955

ONE YEAR CONTINUING INDEX

FORESTRY
New Help for Tree Farmers Dec. 1954
Door-To-Door Sawmills .....Jan. 1955
Tree Farming His Business ..Feb. 1955
Tree Life-Belts .....May 1955

FRUIT
Changing Nature in Orchard Aug. 1954
Fireblight Conquered .....Nov. 1954
Mulch in Orchard .....Dec. 1954
Delicious Pear .....Feb. 1955
Storm Damaged Trees .....May 1955

HAY AND HAY CROPS
Beat the Weather .....June 1954
Grasslands, Fertilizer Use ..June 1954
Dry Chopped Hay .....Oct. 1954
Crop Driers Beat Weather ..Nov. 1954
Make Drying Safer .....Dec. 1954
Longer Life for Ladino ....Jan. 1955
Steps to Meadows .....Feb. 1955
Seven Year Alfalfa .....Mar. 1955
Drying Speeds Harvest .....May 1955
Eight Tons Per Acre .....May 1955

HOGS
Feeding Your Pigs .....June 1954
Age to Wean Pigs .....June 1954
$1,000 A Month from Pigs ..June 1954
Better Swine Management ..Oct. 1954
One Litter System .....Oct. 1954
Sell Pigs 24 Times A Year ..Nov. 1954
Cheaper Beef from Cornfields Nov. '54
More Pork Per Sow .....Dec. 1954
Sells Hogs Year 'Round ....Dec. 1954
Revolution in Pig Raising ..Jan. 1955
Meat Type Hogs .....Jan. 1955
"Must" Pig Feeds .....Feb. 1955
Care at Farrowing .....Mar. 1955
Feed Sows Well .....May 1955
Pampered Pigs Profit .....May 1955
Corn for 1500 Shotes .....May 1955

IRRIGATION
Irrigation, Income Insurance June 1954
Irigation, Better Pastures ..Oct. 1954
Irrigation, Sweeping S'east Dec. 1954
Drudgery Out of Irrigation .Jan. 1955
Dairymen Double Production Feb. 1955
Corn Irrigation .....Mar. 1955

INSECTS and INSECTICIDES
Root Borer in Red Clover ..Dec. 1954
1955 Insecticides .....May 1955

PASTURES
66 Sq. Miles Pasture .....Aug. 1954
Rationed Grazing .....Oct. 1954
New Ranges for Old .....Nov. 1954
Superphosphate for Meadows Nov. 1954
Have Good Pastures .....Dec. 1954
Renovating at $5 Per Acre ..Jan. 1955
New Johnson Grass Hybrid Feb. 1955
New Strip Grazing .....Feb. 1955
Grazing Alfalfas .....Mar. 1955
Primer of Renovation .....Mar. 1955
Birdsfoot Trefoil .....Mar. 1955
Pasture Booster .....May 1955
Green Lot Feeding .....May 1955

POULTRY
Blaisings Choose Turkeys ..June 1954
Production Testing Broilers June 1954
Turkey Growth Factors ....Aug. 1954
Whip Coccidiosis .....Aug. 1954
Let Water Do Running ....Oct. 1954
Spray Immunity into Chicks Nov. 1954
Newcastle Vaccine .....Dec. 1954
High Feed Efficiency .....Dec. 1954
New Way Vaccinate Chicks Jan. 1955
Efficient Laying Rations ...Jan. 1955
Turkeys, Profitable Sideline Feb. 1955
Sq. Ft. Per Pullet .....Mar. 1955
Little Things with Broilers Mar. 1955
Turkey Breeder Selection ...May 1955

SHEEP and GOATS
Before You Start with Sheep June '54
Sheep Money Back Year ...Aug. 1954
Putting On 20 lbs. Per Lamb Oct. 1954
Lamb Pools Pay .....Nov. 1954
Feed 600 Sheep, 15 Minutes Nov. 1954
He Saves Lambs .....Jan. 1955
Money on Sheep .....Jan. 1955
No Change for Lambs ....Feb. 1955
7 Ds of Sheep .....May 1955

SILAGE
Making Trench, Stack Silage June '54
Bisulphite Salt on Silage ..Aug. 1954
Cows Lose Weight on Silage Oct. 1954
Ways to Easier Silage .....Oct. 1954
Baled Silage .....Mar. 1955
Bunker Silos .....May 1955

SOILS
Improve Soil Tilth .....June 1954
Know Soil Before Subsoil ..Aug. 1954
Why Judge Land? .....Nov. 1954
Quick Soil Build-up .....Dec. 1954
Soil Trace Elements .....Jan. 1955
Youth Soil Award .....Feb. 1955
Fixed Nitrogen .....May 1955
Bored Way To Profits .....May 1955

VETERINARY
How Not to Calf a Cow ..June 1954
Phenothiazine Pays in Beef Aug. 1954
No Milk Fever .....Aug. 1954
Cleaning Cows After Calving Aug. '54
Repeat Breeders Expensive ..Oct. 1954
How Vaccines & Serums Work Oct. '54
After-Calving Complications Nov. 1954
Easy Parasite Control .....Nov. 1954
Detergents for Bloat .....Dec. 1954
Feed Calves Little, Often ..Dec. 1954
Negligence Leads to Poisoning Jan. '55
Shipping Fever .....Jan. 1955
No Brucellosis Cure .....Feb. 1955
Sudden Death Among Cattle Feb. 1955
Little Pigs Need Attention .Feb. 1955
Damage to Teats .....Mar. 1955
Dehorning Calves .....Mar. 1955
Operation Screwworm .....May 1955
Do About Bloat .....May 1955

WEEDS
New Vine Killer .....Aug. 1954
2,4-D Doubles Pasture .....May 1955

MISCELLANEOUS
Fence Building Tips .....Aug. 1954
Costs of Maple Syrup .....Oct. 1954
Profit from Horses .....Oct. 1954
Loss from Lightning .....Oct. 1954
Christmas Tree Farming ...Feb. 1954
Fence Posts .....Dec. 1954
Rats Spoil Profits .....Dec. 1954
4-H Rough on Rats .....Jan. 1955
Farmer in Wonderland .....Jan. 1955
Extension's New Look .....Feb. 1955
New Type Community .....Feb. 1955
Agriculture and Atom .....May 1955
New Weather Prophet .....May 1955
Pleasure Horses Are Fun ...May 1955

Best Farm Books For Your Library

Select titles you need and order from these pages.

A good farm book can substitute for a lot of unhappy farming experience and cost you a great deal less in time and money.

ORDER BOOKS DIRECT FROM THESE PUBLISHERS—Identifying numbers at left appear also in book title descriptions to tell source of each book. Send $.15 per book to cover postage.

(1) Devin-Adair Co., 23 E. 26th St., New York 10, N. Y.
(2) C. H. Hinman, Grand Junction, Colorado.
(3) Iowa State College Press, Press Building, Ames, Iowa.
(4) Farmer's Digest, Box 404, Fort Atkinson, Wisconsin.
(5) Springer Publishing Co., 44 E. 23rd St., New York 10, N. Y.
(6) John Wiley & Sons, Inc., 440 Fourth Ave., New York 16.
(7) Ronald Press Co., 15 E. 26th St., New York 10.

ARTIFICIAL BREEDING

Artificial Breeding of Farm Animals. Perry. 1952 Edition. (Source 4) $5.00

BEEF CATTLE

Beef Cattle. 4th Edition. R. R. Snapp. 641 pages. 1952. (Source 6) $6.50

DAIRY CATTLE AND DAIRYING

Dairy Cattle. 1955. 4th Edition. W. W. Yapp and W. B. Nevens. U. of Illinois. 420 p. (Source 6) $4.76

Fitting and Showing Dairy Cattle. 112 p. 1952. (Source 3) $2.00

Dairy Cattle Feeding and Mgt., Henderson-Reaves. 1954 (Source 6) $5.50

FARM CROPS

Hunger Signs in Crops. Color photos. Practical. (Source 4) $4.50

Crop Production, Principles and Practices, Ahlgren. 1953. (Source 4) $4.50

Plant Regulators in Agriculture. Turkey. 1954. (Source 6) $5.50

How to breed and feed . . .

DAIRY CATTLE

New Fourth Edition

By W. W. YAPP & W. B. NEVENS both of the University of Illinois

This fact-packed book shows how to select, feed, and manage all types of dairy cattle; how to improve pasture and dairy buildings, etc. 1955. 420 pages. Illus. $4.76.

BEEF CATTLE

Fourth Edition

By the late R. R. SNAPP

All latest breeding and feeding techniques. Also, new data on grass silage, artificial insemination, vitamins, etc. with 250 easy-to-use tables. 1952. 641 pgs. Illus. $6.50

Order ten-day trial copies of these books from:—

JOHN WILEY & SONS, Inc.
440 Fourth Ave., N. Y. 16, N. Y.

Protect Your Farm

LAW AND THE FARMER by Beuscher. What law means in every situation of work and life on a farm. What you must do to steer clear of legal troubles and how to gain all benefits under State and to water rights.
Federal laws. Everything from wills
416 pages. Send only $4.95

Livestock Health Encyclopedia
Edited by R. Seiden. How to improve the health of your cattle, sheep, hogs, other livestock. Which remedies to use for best results at lowest cost, in prevention and treatment of diseases, parasites, common injuries. The advice of 314 specialists in easy ABC order. 624 pages, 300 illustrations.
Send only $7.50

TRIAL ORDER. Within ten days you may return book(s) for full refund.

Springer Publishing Company, Inc.
44 E. 23rd St., New York 10, N.Y.

FARM MANAGEMENT

Farm Records. Hopkins & Heady. 320 pages. (Source 3 .....$3.75

How to Make Your Farm Pay. Malone. 1951. 371 p. (Source 3) $3.75

Law and the Farmer. Beuscher. 1955. (Source 5) $4.95

FEEDS

Feeds and Feeding. Complete. Morrison. 1951. 1200 p. (Source 4) $7.00

Feeds and Feeding. Abridged. Morrison. 1951. 631 p. (Source 4) ...$3.50

GENERAL FARMING

Midwest Farm Handbook, 400 p. 1954. (Source 3) $3.00

Grasses and Grassland Farming. Hi Staten. 336 p. (Source 1) $5.00

GENERAL LIVESTOCK

Animal Breeding. Winters. 1954. (Source 6) $5.75

Dual-Purpose Cattle. C. H. Hinman. 320 p. Illus. (Source 2) $5.00

Dean R. Marble; Fred P. Jeffrey

Just Out! Here are the best practices used today on American farms in the commercial production of eggs, chicks, and poultry meat. Shows you how to apply successful techniques for brooding, hatchery practice, housing, feeding and managing the laying flock, marketing, etc. Treats business aspects of poultry farming on a budget basis, enabling you to use local costs.

179 ills., tables. 415 pp. $6

THE RONALD PRESS COMPANY

15 E. 26th St., N. Y. 10, N. Y.

GRASSES AND LEGUMES

Range Management. Sampson. 1952. (Source 6) $7.50

Forages: The Science of Grassland Agriculture. Hughes. 724 p. (Source 3) $6.75

POULTRY

Economics of Poultry Mgt. Botsford. 1952. (Source 6) $5.75

Hatchery Operation and Mgt. Funk-Irwin. 1955. (Source 6) $6.50

Commercial Poultry Production. Marble and Jeffrey. (Source 7) $6.00

From seed to sale . . .

VEGETABLE PRODUCTION and MARKETING

New Second Edition

By PAUL WORK & JOHN CAREW both of Cornell University

All the information you need to buck difficult problems in irrigation, cultivation, planting, harvesting, packaging, selling, etc.

1955. Approx. 528 pages. Prob. $4.48

SOILS and FERTILIZERS

Fourth Edition

By F. E. BEAR, Rutgers University

Up-to-date methods for getting more out of your land. Shows factors affecting plant growth; water requirements; crop yield potentials; physical properties, etc.

1953. 420 Pages. Illus. $6.00

Order ten-day trial copies of these books from:—

JOHN WILEY & SONS, Inc.

440 Fourth Ave., N. Y. 16, N. Y.

SHEEP

Sheep Science. Kammlade. 1947. 534 p. (Source 4) $6.00

TREES AND FORESTRY

Improved Nut Trees of North America and How to Grow Them. Reed & Davidson. (Source 1) $6.00

VETERINARY

Livestock Health Encyclopedia. Seiden. 624 p. 300 Illus. 1951 (Source 5) $6.95

This listing of farm books is a service to our readers and to publishers. For information about costs, write to Farmer's Digest, Fort Atkinson, Wisconsin.

We recommend these suppliers to you. We believe you can deal with them with confidence. This list is not prohibited to any firm who meets our requirements. Listing price is $15.00 per year per product. Write to Farmer's Digest, Fort Atkinson, Wisconsin.

AGRICULTURAL NEWS LETTERS

Doane Agricultural Service, Inc., 5144 Delmar Blvd., St. Louis 8, Missouri. Management Service.

ARTIFICIAL BREEDING EQUIPM'T

National Agricultural Supply Co., Fort Atkinson, Wisconsin. Catalog.

FERTILIZERS

"Na-Churs" Plant Food Co., 463 Monroe St., Marion, Ohio. Also; London, Ontario, Canada.

LIVESTOCK EQUIPMENT

National Agricultural Supply Co., Fort Atkinson, Wisconsin. Catalog.

Subscribe now to Yorkshire Journal, learn about fastest growing breed of "meat-type" hogs, $1 per year. Write:

American Yorkshire Club
Lafayette, Indiana

POULTRY EQUIPMENT

The Cyclone Mfg. Co., Urbana, Indiana. Modernized poultry supplies.

POWER LAWN MOWERS

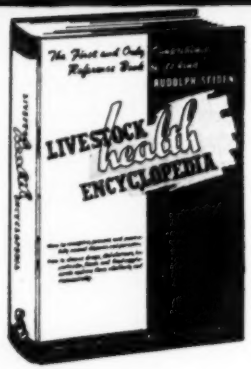
Wind-King Electric Mfg. Co., Merrill, Iowa. Rugged, farm type rotary mowers.

SOIL TESTING SUPPLIES

National Agricultural Supply Co., Fort Atkinson, Wisconsin. Catalog.

VETERINARY PRODUCTS

Anchor Serum Co. of Indiana, Indianapolis, Indiana. Veterinary Catalog.



How To Guard the Health and Value of your Livestock

LIVESTOCK HEALTH ENCYCLOPEDIA

Regular Price $7.50
Special for 60 days only $5.95

Thousands of stockmen believe this big, valuable book is a bargain at $7.50. Now, for only 60 days and only from this ad, you can have your copy for only $5.95. Act now to guard your investment in livestock. Order your copy today.

In simple dictionary form, the LIVESTOCK HEALTH ENCYCLOPEDIA gives you facts you need to protect and improve the health of your farm animals. Tells how to recognize, prevent and control diseases that threaten your animals . . . how to choose and use the latest drugs, disinfectants, insecticides, feed supplements, medicines for your animals.

Here is complete information about the control and prevention of diseases that whittle away the value of your animals. More than 3,700 subjects in alphabetical order explain, step by step, the symptoms, causes and treatment of every known disease that may affect your cattle, hogs, sheep, goats, horses, mules.

Compiled and edited by Rudolph Seiden, well-known consultant on veterinary products and techniques, the LIVESTOCK HEALTH ENCYCLOPEDIA provides, in a single handy source, the experience of 314 experts on livestock health and care. Its 624 pages are filled with useful information, conveniently arranged in alphabetical listings . . . hundreds of illustrations, photographs and charts. Covers 3700 subjects.

Here is your answer to the challenge of keeping your livestock in prime condition. Whether you have few or many animals to worry about, this book will pay for itself dozens of times by helping you save your animals from the ravages of disease, parasites, and other dangers. Just one reference to its handy columns can repay its cost many times. Get your order in the mail today. Send only $5.95 to Farmer's Digest, Box 404, Fort Atkinson, Wisconsin. If not fully satisfied, return the book within 5 days and we will refund your money. Shipped postpaid.